INSTITUTE

SCIENTIFIC AND LABORATORY METHODS OF JUDICIAL PROOF

THE BUREAU OF GOVERNMENT. . .

was established in 1948 by the University Extension Division to make available to Wisconsin public officials technical information and skills that will enable them to serve their communities effectively through -

Training Institutes and Short Courses

Research in Governmental Problems

Advice and Assistance on Special Problems on Request.

ADMINISTRATION

Edwin Broun Fred, Ph.D., D.Sc., L.L.D.
President of the University

Lorentz H. Adolfson, Ph.D.
Director, University Extension Division

James R. Donoghue, Ph.D.
Director, Bureau of Government

Lloyd W. Woodruff, Assistant Director
Ruth Baumann, Instructor

RESIDENCE FACULTY ADVISORY COMMITTEE ON BUREAU ACTIVITIES

William H. Young, Ph.D., Professor of Political Science, Chairman

James L. McCamy, Ph.D., Professor of Political Science

Fred A. Clarenbach, Ph.D., Professor of Political Science

$4.00
31 to Wis. law enforcement officials

INSTITUTE
ON
SCIENTIFIC AND LABORATORY METHODS
OF
JUDICIAL PROOF

Presented by the

Wisconsin State Crime Laboratory
University of Wisconsin Law and Medical Schools
Office of the Attorney General
and the
Bureau of Government

in cooperation with the

Wisconsin District Attorneys' Association
Wisconsin County Boards Association
Wisconsin Bar Association

October 31, November 1 and 2, 1951
at Madison, Wisconsin

The University of Wisconsin
University Extension Division
Madison, Wisconsin
1951

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

FOREWORD

The demand for and the growth of governmental services have added to the duties and responsibilities of the district attorney. Yet one of his most important duties is still the successful prosecution of persons accused of crime. At the same time the district attorney also has the responsibility, which in its social implications is of equal if not of greater importance in criminal matters, of securing the exoneration of innocent persons suspected of criminal acts.

The Wisconsin district attorney no longer needs to rely entirely upon the results of the conventional investigation methods of his own local agencies and upon his own limited resources in prosecuting persons believed guilty of criminal acts. Chemical analysis, the microscope, and the camera--to mention only three important modern tools--can provide him with objective, accurate, and unbiased information that will often be of prime importance in reconstructing the facts in a particular case and in demonstrating those facts in a conclusive way to the judge and jury in court. By their very nature these modern methods are almost invariably subject to critical review and for this reason probably should be given greater weight as evidence than the spoken word of a forgetful, biased, or perjuring witness.

Law enforcement officers, prosecutors, and judges have not always clearly realized or understood the full possibilities of laboratory and other scientific methods in promoting the ends of justice. In some cases, on the other hand, these officials have failed to appreciate fully the limitations of these methods and have expected too much from them. Although university and other laboratories for years had rendered valuable assistance to law enforcement agencies, it was not until 1947, when the Wisconsin legislature provided for the establishment of the State Crime Laboratory, that a special governmental agency on a state level was established to provide the technical assistance in criminal matters to the courts and the various enforcement agencies charged with the conduct of criminal investigation.

This was accomplished in a large measure as the result of the active support this new idea received from the Wisconsin District Attorney's Association. This new state department was and is not intended ever to replace any of the very necessary and excellently executed conventional police functions but rather to provide supplementary technical assistance to all official agencies within the enforcement structure who are charged with the responsibility of conducting criminal investigations.

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

According to the Superintendent of the Wisconsin State Crime Laboratory, this Institute represents the realization of an objective of the late dean emeritus Colonel John Henry Wigmore, who many years ago expressed to Superintendent Wilson the belief that the closest possible working arrangement should exist between a crime laboratory, the law school, and members of the judiciary, if the full potential values and contributions of the crime laboratory technicians were to be realized and utilized.

It is hoped that out of this Institute will come other institutes and courses so that by this method the objectives of Colonel Wigmore and all serious thinking jurists may be achieved.

This Institute is designed as a short course to:

--demonstrate and explain some of the proper uses of laboratory aids to law enforcement in criminal matters, and how these techniques may be used by prosecuting attorneys and judges in this state

--explain how this new technical service can be used to best advantage by the courts and the district attorneys in the proper preparation and presentation of criminal cases which involve the application of these technical methods to selected representative practical problems of judicial proof.

As the title page indicates, a number of interested state and university agencies are cooperating in providing the instruction for this Institute. Through this cooperation it has been possible to focus the best available information and considered judgment on the problems that daily confront district attorneys and judges in the course of their criminal law enforcement activities and interests.

This Institute is the twelfth in a series of institutes for county officials presented by the Bureau of Government. The Bureau, on behalf of all the agencies cooperating in this Institute, wishes to express appreciation to those who prepared materials for this manual and who participated in the program. Without them this Institute would not have been possible. In particular we wish to thank Charles M. Wilson, Superintendent of the Wisconsin State Crime Laboratory, who undertook the task of editor of this manual.

Address all communications regarding this institute to the Bureau of Government, University of Wisconsin Extension Division, Madison.

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

HOW TO USE THIS MANUAL

This publication, which we have elected to refer to as a manual, has been prepared for your use while at this Institute and after you have returned to your official duties in your county.

1. This manual is your "textbook" for this Institute. It contains relevant materials on the problems that will be considered.

Lock at the TABLE OF CONTENTS and see how the Manual is arranged. Then, before the sessions of the Institute start, read the applicable pages.

2. This manual is a notebook. It is put together so that you will have ample room for notes you want to write. Jot down questions that you want to ask. Jot down summaries of important points. These notes will be very valuable later on when you want to refresh your memory on some point that was brought out at the Institute.

3. This manual is a reference book. You can use it to refer to information you may need when you have returned to your office. You may want to hold an "institute" for your own office staff when you go home in order to pass on to them some of the information you obtained at the Institute.

4. This manual is a useful source of material. It will serve as a source if local level conferences or in-service training programs are set up for the guidance and assistance of your local enforcement officers.

5. This manual contains a bibliography and helpful case citations. At the back of the manual there is included, in addition to the material pertaining to the actual program, case citations and a bibliography which will be helpful to you if questions come to the attention of your office that involve the subject matter covered in this Institute. It is hoped that this bibliography will be a constant source of topical information to you in this connection.

This Institute is being conducted with your assistance, and in many of the sessions audience participation is provided for and expected. Since in the preparation of this manual the substance of these discussions cannot be incorporated, you are urged to supplement the published material in this manual by taking notes which will serve as a ready reference to you.

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

The preparation of this manual has been a joint undertaking. Some sections contain articles, papers and other materials previously published and are reproduced here with the kind permission of the authors and the copyright holders.

All other materials in the manual are original materials, preparation of which could not have been undertaken without the active support, helpful suggestions and criticisms of all the members of the Wisconsin State Crime Laboratory, particularly the following: L. J. Goin, microanalyst; J. C. Wilimovsky, polygraph operator; Don M. Harding, examiner of questioned documents; Elmer Hohnberger, photographer; Albert D. Hamann, field unit operator, and the clerical and stenographic staff.

Charles M. Wilson, Superintendent
Wisconsin State Crime Laboratory

P R O G R A M

INSTITUTE ON LABORATORY AND SCIENTIFIC METHODS OF JUDICIAL PROOF

All sessions of the Institute, except where otherwise indicated, will be held in the Memorial Union, Park and Langdon Streets, Madison

Wednesday, October 31

9:00-9:10 Welcome: Oliver S. Rundell, Dean, Law School, University of Wisconsin

9:10-9:30 Uses of Field Unit and Technical Laboratory Facilities as Aids in the Investigation of Major Offenses
Charles M. Wilson, Superintendent, Wisconsin State Crime Laboratory

9:30-10:00 The Pathologist's Findings in Death Investigations
Dr. Alan R. Moritz, Professor and Chairman, Department of Pathology, Western Reserve University, Cleveland

10:10-11:50 Medical and Toxicological Examinations
Panel: Dr. Alan R. Moritz, Professor and Chairman, Department of Pathology, Western Reserve University, Cleveland

Dr. D. Murray Angevine, Professor of Pathology, University of Wisconsin Medical School

Dr. Frank L. Kozelka, Associate Professor of Toxicology, University of Wisconsin Medical School

Dr. E. L. Tharinger, Clinical Pathologist, Milwaukee

Dr. L. J. Van Hecke, Medical Examiner, Milwaukee

Mr. William A. Platz, Assistant Attorney General, State of Wisconsin

Mr. Charles M. Wilson, Superintendent, Wisconsin State Crime Laboratory

12:00 Noon Luncheon
Talk by the Honorable Gerald J. Boileau
Circuit Court Judge - 16th Circuit - Wausau

1:30-2:20 Use of Photography in Crime Scenes
Elmer Hohnberger, Photographer, Wisconsin State Crime Laboratory

Albert Hamann, Field Unit Operator, Wisconsin State Crime Laboratory

2:30-3:20 The Mechanics of the Proper Uses and Admission of Photographs in Evidence
Edwin Conrad, Attorney, Madison

3:30-4:20 Questioned Documents
J. H. Mathews, Professor and Chairman of the Department of Chemistry, University of Wisconsin

4:30-6:00 Wisconsin State Crime Laboratory facilities will be open for the inspection of those attending the Institute at 917 University Avenue (2 blocks from the Memorial Union Building).

Thursday, November 1

9:00-9:30 The use of tests for alcoholic intoxication.
Dr. R. N. Harger, Professor of Biochemistry and Pharmacology, Indiana University Medical Center, Indianapolis

9:30-10:50 Chemical Methods of Testing for Alcoholic Intoxication. A suggested program to meet this problem. Panel discussion.
Discussion Leader: Dr. R. N. Harger, Professor of Biochemistry and Toxicology, Indiana University Medical Center, Indianapolis

Dr. Frank L. Kozelka, Associate Professor of Toxicology, University of Wisconsin

Dr. E. L. Tharinger, Clinical Pathologist, Milwaukee

Dr. L. J. Van Hecke, Medical Examiner, Milwaukee

11:00-12:00 Use of the Results of Tests for Alcoholic Intoxication in Court.
Dr. R. N. Harger, Dr. Frank L. Kozelka, Dr. E. L. Tharinger, Dr. L. J. Van Hecke, Mr. William A. Platz, Mr. Charles Crownhart, Executive Secretary, State Medical Society of Wisconsin, Mr. Bruce Weatherly, Chief of Police, Madison, Wisconsin

12:00 Noon Luncheon
Talk by the Honorable Arthur W. Kopp, Circuit Court Judge - 5th Circuit - Lancaster

1:30-2:40 Microanalytical Techniques Applied in Selected Criminal Cases--blood, fabrics, stains, hair, clothing, and debris
Jack Goin, Microanalyst, Wisconsin State Crime Laboratory

2:50-3:20 Use of Psychiatrist's Findings in Court
Dr. Hans H. Reese, Professor of Neuropsychiatry University of Wisconsin Medical School

3:30-4:20 Bogus Check Cases and the Examiner of Questioned Documents, Richard Bardwell, District Attorney, Dane County, Donald Harding, Staff Member, Wisconsin State Crime Laboratory

4:30-6:00 Wis. State Crime Laboratory facilities will be open for inspection of those attending the Institute

Friday, November 2

9:00-9:50 Comparative Micrography, Physical, Mechanical, and Special Laboratory Techniques in Criminal Cases, Mr. Wilson
Tool marks, firearms evidence, mechanical, electrical and physical testing methods in criminal matters

10:00-11:15 Law and Practical Procedures in Interviewing Witnesses and Suspects
Mr. Platz, Mr. Wilson

12:00 Noon Luncheon
The Admission of Confessions in Evidence
The Honorable Herbert J. Steffes, Judge Municipal Court, Milwaukee, Wisconsin

1:30-4:30 Practical Applications of Modern Technical Aids to Actual Situations
Panel: Mr. Wilson, Mr. Platz, Mr. Remington, Mr. Young, Mr. Conrad, Dr. Tharinger, Dr. Van Hecke, Dr. Kozelka, Dr. Angevine, Dr. Reese and others, including Crime Laboratory Staff

6:00 Dinner
"What Wisconsin Can Expect From Chicago Organized Crime"
Virgil Peterson, Operating Director, Chicago Crime Commission

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

TABLE OF CONTENTS

***

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

LIST OF FIGURES

***

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Part I

THE WISCONSIN STATE CRIME LABORATORY

THE WISCONSIN STATE CRIME LABORATORY

Because the Wisconsin State Crime Laboratory (hereafter "the Laboratory) is a unique, new state department, the first section of this manual presents an over-all description of its operation.

Its Purpose and Services

Purpose. The purpose of the Laboratory is to provide technical assistance to local law enforcement officials charged with the responsibility for the conduct of investigations.

To fulfill its purpose the laboratory may use research and testing methods especially designed for each separate case. Insofar as the Laboratory is concerned, it makes little difference whether or not a particular technique has previously been given judicial recognition by an appellate court. The essential questions are: Will the technique stand the test of critical review? Are the findings consistent with the facts and with the present state of particular technical field concerned? Were proper and adequate materials and controls available for the technicians' study and consideration?

Under proper controlled conditions circumstantial evidence is capable of producing the strongest kind of evidence or proof of facts that can be adduced. The Laboratory can help provide the "proper controlled conditions." When modern laboratory methods are properly used, the conclusions are scientific in the sense that they can withstand any critical review which is properly undertaken independently by another skilled technician. The confirming conclusions stand as the strongest kind of evidence that can be produced. For in contrast with the testimony of an interested witness the conclusions of the technician have been rendered by a disinterested party without fear or prejudice. The findings of the Laboratory, therefore, are in effect much stronger than the testimony of an interested witness.

Services. The technical services of the Laboratory are available to the following state, county, or city law enforcement officials in matters of official interest and which are a part of criminal investigations: the Governor; judges sitting in courts having jurisdiction where criminal matters before the court require the application of technical methods; the Attorney General's office; district attorneys of the state; police chiefs; sheriffs; and the adminstrative head of any state department charged with the responsibility of criminal investigation.

In general, the Laboratory's services include the following: (1) consultation with the referral agency administrative officer or his delegated representative, relative to application of laboratory technical aids applicable and likely to yield information of value

either as an investigative aid or of probative value in subsequent judicial proceedings; and (2) actual laboratory examinations, identifications, comparisons, study, and evaluation of physical evidence, materials, suspects, or witnesses or situations encountered in the course of criminal investigations or an investigation which involves the possibility of a criminal offense.

There has been established a program of research and development designed to extend and broaden existing knowlege and information, to provide for the modification of existing techniques, and to develop special or new techniques for solving specific problems confronting the Laboratory and the prosecuting attorney. This program has been arranged so that in the investigation of specific problems, practically the entire laboratory staff takes an active part. At the completion of each specific problem undertaken, the results of the entire investigation are formally recorded. Each report is bound and copies are placed in the University of Wisconsin Library, State Law Library and the Laboratory's own extensive reference library.

The Laboratory's mobile field unit, when requested by the Governor, the Attorney General, or the district attorney of any county, will be made available to assist local enforcement agencies in processing the crime scene and in recovering all types of physical evidence. Such requests usually should concern the following major offenses: murder, kidnapping, rape, and arson. A detailed description of the field unit has been included in this manual. When such requests are received from a district attorney or his representative, the Laboratory insists that a local enforcement officer (either deputy sheriff or police officer) be detailed and instructed to remain continuously with the field unit operator as long as the field unit operator is engaged in recovery of evidence and processing of the crime scene.

The field unit upon the request of either the Governor or the Attorney General and the district attorney will also be made available to aid in the processing of the scene of disasters resulting in a death(s). "Disasters include explosions, falling buildings, fires, crashed aircraft, etc. It has been found from experience that the extensive facilities of the field unit are invaluable in disaster situations, because such disasters which result in deaths present the question of the cause of such disasters, which is in turn related to the determination of possible criminal responsibility for the disaster in question.

The processing of the scene of disasters includes the identification by all modern means of the dead victims' bodies, as well as the processing of the physical evidence available at the scene of the disaster in relation to the probable or possible cause of the disaster.

The Wisconsin Law Enforcement Bulletin is edited and published monthly by the Laboratory. This provides a media of exchange for confidential information among local, state, and federal law enforcement agencies throughout the United States. Law enforcement officials are invited to submit materials to the Laboratory for inclusion in the bulletin whenever it is felt that the circulation may benefit the various enforcement agencies. Approximately 710 copies of each issue are distributed.

Its Location, Hours and Facilities

Location. The Laboratory occupies temporary quarters aggregating approximately 7,000 square feet of floor space in a University-owned building at 917 University Avenue, Madison 5, Wisconsin. It is the plan of the Crime Laboratory Board and the University Board of Regents that the permanent Laboratory quarters will ultimately be located on the University campus in close proximity to both the law and medical schools.

Hours. The Laboratory's hours are from 8 a.m. to 5 p.m. Monday through Friday; on Saturdays a skeleton clerical and technical force is available from 8 a.m. to noon. In emergency situations, by prior appointment arranged through district attorneys, extensions of the above hours may be arranged with the Laboratory superintendent.

Facilities: Telephone. Twenty-four hour telephone service is provided by telephone tie lines through the manual capitol switchboard, 6-4411, extensions 693 and 694. If emergency calls are received from district attorneys, police chiefs, or sheriffs by capitol operators during hours when the Laboratory is closed, the capitol operators will refer such emergency calls to the home telephone of the Laboratory superintendent.

Facilities: Radio Teletype. Radio messages directed to the Laboratory via the State Motor Vehicle Department's traffic radio network are received at the key radio station, KSA535 at Baraboo, Wisconsin, thence via teletype to the State Office Building, Madison, and by telephone to the Laboratory or, during hours when the Laboratory is closed, to the superintendent's home.

Facilities: Plant and Equipment. The Laboratory includes several integrated, smaller laboratories. Each laboratory is under the supervision of a laboratory technician who possesses the requisite technical skills and training to perform the necessary examinations and comparisons intended to be undertaken in these laboratories. There is provided in each the most modern facilities and equipment capable of performing, as completely as possible, each specific technical function intended for these smaller laboratories.

The Laboratory provides law enforcement officers and court officers in Wisconsin with one of the nation's most modern and complete services of this type. This is due to several factors: (1) the excellent equipment possessed by the Laboratory; (2) the background and training of the Laboratory's personnel; and (3) the availability of University personnel, technical services and equipment.

University of Wisconsin As provided in Section 165.04, Wisconsin Statutes, the president of the University appoints five members of the faculty who serve as a technical advisory board to the Crime Laboratory Board and the superintendent. This technical advisory committee serves to coordinate the research interests of the University and the Laboratory.

The Laboratory superintendent can obtain assistance from the University whenever he believes that the specialized knowledge, facilities, and skills available from the University faculty will contribute to the processing of case materials. In many instances contributions to investigations have been made by the Medical School faculty, Chemistry Department, Department of Zoology and Department of Mining and Metallurgy.

Its Administrative Procedures and Policies Because no two criminal investigations ever were identical in all details, the techniques of investigation are adapted to each case. Therefore, it would be difficult to describe herein the relative merits of specific technical methods. However, the manual does include:

1. A list of the general types of examinations the Laboratory is prepared to undertake. (See following subdivision.);

2. Suggestions regarding the types of physical evidence likely to be encountered in specified types of examinations. (Discussed in Section II.); and

3. Suggestions regarding proper methods of recovery and of marking for purposes of identification.

Also an attempt will be made to suggest the types of materials most likely to provide information of value to the Laboratory. The Laboratory's staff strongly believes that its effectiveness can be very substantially reduced or adversely affected if the materials sent to the Laboratory are inadequate or were improperly collected.

General Types of Examinations the Laboratory is Prepared to Undertake:

1. Identification of seminal material

2. Identification of blood as to species and blood type

3. Comparison or identification of hair, fibers, glass, soils, firewall, paints, pigments, metals, plastics, fabrics, oils, greases, pharmaceuticals, stains, narcotics, poisons, foot and tire and tool impressions, ropes, cordage, paper and fingerprints

4. Development of latent fingerprints

5. Examination of questioned documents including handwriting and typewriting comparisons

6. Ink comparisons and identifications

7. Embossed invisible, erased, or effaced writing

8. Firearms identification - Comparison of fired bullets

9. Shells, determination of the distance at which gunshot wounds or shots are fired

10. Comparative micrography or study and comparison of various types of tools and toolmarks

11. Application of spectrography, spectrophotemetry, radiography

12. Administering polygraph or lie detector tests

13. Interrogation, witnesses and criminal suspects

14. Examination of scene of explosions to determine type of explosive involved

15. Restoration of eradicated stamped serial numbers on metal objects

Case Referral Sheets. Case referral sheets are to be filled out by the responsible adminstrator of any qualified agency desiring assistance from the Laboratory. (A copy of the referral sheet is included in this manual.)

The information and data sought in the case referral form should be as complete as possible, since the information sought represents the minimum required by the Laboratory. This case referral form should be forwarded to the Laboratory either by letter or should accompany the initial physical evidence which is submitted to the Laboratory for its consideration.

If there appears to be any question as to the proper method of recovery and preservation of physical evidence encountered in the conduct of a criminal investigation either by a police department, a sheriff, a district attorney, or the Attorney General's office, the Laboratory will assist in the collection of the evidence.

Experience has indicated that the evidentiary value of many important items of evidence encountered in criminal investigations are minimized or destroyed completely by the improper recovery, handling, marking for identification, packaging and shipping to the Laboratory of some items of physical evidence. Because of this, reasonably complete material has been included in this manual suggesting the proper and desirable methods of marking, sealing, packing for transportation of the more common types of physical evidence encountered to the Laboratory for evaluation and study.

The Laboratory suggests that it is unwise for a district attorney to act as a messenger transporting physical evidence to the Laboratory, since he may subsequently be called as a witness to trace the custody of such exhibits prior to their admission in evidence. This may cause complications as well as embarrassment.

The contributions of the Laboratory to investigations have never, nor will they ever, replace a complete and thorough investigation. They present a supplementary approach to many perplexing questions. The Laboratory is not a panacea for all problems confronting an enforcement agency. The Laboratory, in addition to being supplied with proper materials encountered in, and pertinent to, an investigation, must have made available accurate, detailed and specific information.

The Laboratory, when giving consideration to a technical matter referred to it, proceeds in an orderly manner to consider what factual information can be developed from a detailed study of a particular problem. As an example: in many cases the submitting agencies have unknown materials at the Laboratory "for analysis." Little or no information is communicated to the Laboratory concerning what materials are to be searched, what information is desired, or what identifications are needed.

To illustrate the importance of giving adequate instructions to the Laboratory: in poison cases the toxicologist starts his examination with an unknown, follows a pattern whereby he eliminates a great many materials as not being present in the unknown. As many as 60 or 70 unknowns may be searched for before he has completed his examinations. This is costly, time consuming, and necessitates use of some of the unknown materials. Under these conditions much time and expense can be saved if such information as the following is given to the Laboratory: materials suspected of being involved; a complete summary of information including symptoms of the deceased person prior to death and an accurate medical account of treatment given prior to death; and the nature of materials suspected or known to have been available to the victim or suspect, prior to death.

In brief, the Laboratory should have as much information as is possible before it proceeds with its investigations of materials sent to it.

Laboratory Reports. The results of Laboratory examinations conducted are made available in a confidential privileged report rendered to the district attorney and to the submitting agency. The formal official Laboratory written report form and jacket is reproduced in Figs. 1 and 2.

The Laboratory considers the district attorney to be the logical coordinating law enforcement official within each of the 71 Wisconsin counties, since, the Laboratory has been limited by the Legislature to matters which are both of official interest and a part of a criminal investigation. The Laboratory policy is to advise the district attorney not only of the receipt of materials by the Laboratory from any law enforcement agency in his county, but also of the results of any Laboratory examination undertaken. This is done by rendering to the district attorney a copy of the official Laboratory report. Also a copy of this report is forwarded to the submitting law enforcement agency. The Attorney General's office, when it requests, will receive a copy of a Laboratory report.

The Laboratory is initiating a unique method of reporting Laboratory findings and recommendations as depicted in Figs. 1 and 2, wherein speciment copies of the new Laboratory report jacket are reproduced. Stenographic work has been minimized as far as possible and the report is limited to the opinions rendered or results of examinations undertaken. Suggestions concerning use of the report are on page 2 of the report jacket. The insert page of the report, Fig. 2, is confined to results of Laboratory examinations, comparisons, and/or recommendations. In order to facilitate preparation of portions or excerpts from the official Laboratory report, the insert page or pages can be referred to by page and line number by a district attorney when requesting the Laboratory to prepare for use all or any portion of the report as evidence at a preliminary hearing.

Use of Laboratory Findings in Court - Preliminary Hearings. Section 165.04 (3) Wisconsin Statutes, 1949, as amended, provides that: "At any preliminary examination a report of the Laboratory's findings with reference to all or any part of the evidence submitted to it, certified as correct by the superintendent, shall when offered by the state or the accused be received as evidence of the facts and findings therein stated if relevant and otherwise admissible in evidence. The expert who made the findings need not be called as a witness unless his appearance is demanded by the opposing party, in which case the magistrate shall so order and adjourn the hearing to a time when the expert is available to testify."

When either a district attorney or a representative of the Attorney General's office believes that excerpts from the official Laboratory report may be required at a preliminary hearing, he should advise the superintendent in advance of the actual date set for the preliminary hearing so that such excerpts may be properly prepared and certified as correct by the superintendent and be made available by mail for the use of the state's representative during the hearing. For reasons of economy, the appearance of a laboratory technician to give testimony at a preliminary hearing is only possible under the special circumstances provided for under the statutory provision quoted above.

In cases where it is anticipated by a district attorney or a representative of the Attorney General's office that the appearance and expert testimony of one of the laboratory technicians will be required in court, the superintendent should be advised of such anticipated appearances as far in advance as possible so that time may be allotted in our work schedule for these appearances. Because of the cost involved and also because of the work schedule at the Laboratory, the superintendent should not be asked to make a technician available until a jury is impaneled. It is recommended that the appearance of laboratory technicians as expert witnesses be planned so that as far as possible the exhibits about which he will testify are in evidence or at least are identified by prior witnesses before the laboratory technician takes the witness stand.

Where such appearances are to be made by a laboratory technician, it is recommended that the Attorney General's representative, the district attorney, or the assistant district attorney, who is to examine such laboratory witnesses, arrange for a conference with the technician prior to the time that he is actually called as a witness. This is suggested so that the prosecutor may be fully acquainted with the technician's qualifications and also the results of the technical examinations made by him.

The results of Laboratory examinations, analyses, etc. are privileged material and not available except to designated enforcement officials. The exception to this is in the event a subpoena is properly issued by a circuit court and served on the superintendent, in which event any information contained in the Laboratory files pertaining to a particular case before the court will then be made available to the court.

Disposition of Materials Submitted. Reference is made to the last page of the report jacket (Fig. 1) wherein the amended Wisconsin Statutes, 165.06, are quoted. There is provided a form to be filled out by the district attorney and returned to the Laboratory, indicating the desired disposition of materials previously submitted for examination.

Non-Participation in Civil Matters. The Laboratory is specifically prohibited from participation in matters relating to preparations for civil litigation unless such civil matters are referred to the Laboratory by the Attorney General's office. The matter must be one in which the state has an interest, and as such, requires and requests the technical assistance available at the Laboratory through the Attorney General.

***

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Fig. 1A REPORT JACKET - WISCONSIN STATE CRIME LABORATORY

Front Cover, Report Jacket

WISCONSIN STATE CRIME LABORATORY
917 University Avenue
Madison 5, Wisconsin

CONFIDENTIAL REPORT OF LABORATORY FINDINGS

Case Name_____ Date_____ 195__

Laboratory Master Number_____ Submitting Agency Numbers_____

Submitted herewith please find the confidential report of the results of this laboratory's examinations conducted in connection with the case referred to above.

Distribution of copies of this report are being made as follows:

District Attorney:_____

Submitting Authority:_____

Other Authorities:_____

If required either in preparation for trial or to aid your investigation of the above case, additional information regarding examinations made will be supplied upon receipt of a written request from the district attorney.

Attached to and made a part of this report are the following:_____

_____

Please be assured of our assistance whenever possible.

Yours very truly

C. M. Wilson
Superintendent

Page 1 of___pages
Please note printed instructions inside front and back pages.

Source: Wisconsin State Crime Laboratory

Inside Page of Front Cover

PRELIMINARY EXAMINATIONS:

Wisconsin Statutes 165.04 (3). At any preliminary examination a report of the laboratory's findings with reference to all or any part of the evidence submitted to it, certified as correct by the superintendent, shall, when offered by the state or the accused, be received as evidence of the facts and findings therein stated, if relevant and otherwise admissible in evidence. The expert who made the findings need not be called as a witness unless his appearance is demanded by the opposing party, in which case the magistrate shall so order and adjourn the hearing to a time when the expert is available to testify.

DISTRICT ATTORNEY - PLEASE NOTE:

If it is anticipated that any of the material covered in this report will be required at the preliminary hearing, the district attorney should indicate in writing those portions of this report or other reports pertaining to this case which he desires to use in the preliminary hearing. This should be done as far in advance of the hearing as possible so that the Superintendent may prepare desired excerpts from the laboratory reports, certify them as being correct, and make them available to the district attorney in advance of the preliminary hearing. This is suggested in view of the provision in the Wisconsin Statutes 165.04 (3) relating to preliminary examinations as quoted above.

IMPORTANT: To be of maximum assistance to all concerned with this case it is essential that the laboratory be advised of the following:

1. Subsequent developments in this investigation.
2. Disposition of case.
3. If examinations of additional materials in this investigation are required, please refer to case name and master number as shown on Page 1 when submitting such additional materials.
4. Desired disposition of materials in possession of laboratory and described on attached receipt forms. (See inside back page of this report jacket).

If it is anticipated that testimony of laboratory personnel will be required before county or circuit court, the Superintendent should be advised in writing as far in advance as possible so that any necessary exhibits may be prepared and the laboratory may anticipate the schedule of court appearances accordingly.

It is necessary that prior to an appearance in court, a conference be held including the laboratory expert witness(es) and the district attorney who is to examine such witness(es).

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Fig. 1B

Insert Page for Reporting Results of Laboratory Findings

LABORATORY DESIGNATION OF EXHIBITS ON RECEIPT FORM

WISCONSIN STATE CRIME LABORATORY

Laboratory Case Numbers _____ Page No. ___

Source: Wisconsin State Crime Laboratory

Last Page of Jacket Cover

Page No. ___

DISPOSAL OF MATERIALS SUBMITTED TO THE LABORATORY:

Wisconsin Statutes 165.06 DISPOSAL OF EVIDENCE. Whenever the Superintendent is informed by the submitting office or agency that physical evidence in the possession of the laboratory is no longer needed, the Superintendent may, unless otherwise provided by law, either destroy the same, retain it in the laboratory or turn it over to the University of Wisconsin upon the request of the head of any department thereof. Whenever the Superintendent receives information from which it appears probable that such evidence is no longer needed, he may give written notice to the submitting agency and the appropriate district attorney by registered mail of his intention to dispose of the evidence and if no objection is received within 20 days after such notice was mailed, he may dispose of such evidence as herein provided.

Cut on dotted line, fill out, sign and return to the Wisconsin State Crime Laboratory.

.....

AUTHORIZATION FOR DISPOSITION OF MATERIAL

Wisconsin State Crime Laboratory
917 University Avenue
Madison 5, Wisconsin

With reference to the items listed on the attached receipt form, you may:

1. Dispose of all items submitted and listed on the receipt form except item Nos. _____.
2. Return the items excepted and listed under (1) above to _____.
3. Return all items listed to _____.
4. Hold all items submitted pending final disposition of this case which is scheduled to be heard on _____.
5. Retain in your custody the following items _____ and return all other items to _____.
6. If your wishes regarding the disposition of materials submitted are not covered by the five alternatives above, please indicate disposition ___ _____.

Date _____ 195 -

District Attorney

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

EXPLANATORY NOTE

In this part of the manual the following materials have been inserted:

1. The Wisconsin State Crime Laboratory Field Unit Number One
   (Do not confuse the figure numbers in this inserted article with the others in the manual.)

2. Case Data From Submitting Enforcement Agency (referral sheet)

***

THE WISCONSIN STATE CRIME LABORATORY FIELD UNIT

NUMBER ONE

The purpose of the Wisconsin State Crime Laboratory field unit (Fig. 1, 2 & 3) may be summarized as follows: Its prime purpose is to afford in the field or at the scene of a crime of violence of the first magnitude the necessary modern facilities and aids to permit the field unit personnel to recover and preserve all physical evidence that may be encountered in the investigation of a crime of violence of the first magnitude, and in which the laboratory has been requested to participate by the district attorney, sheriff, or police chief. Contrary to a mistaken idea the superintendent has found to exist, it is not the purpose of the field unit to provide complete laboratory facilities in this mobile unit, but rather, as a much more practical and economical function to provide mobile facilities and unit personnel to assist in the proper recovery and preservation of practically every type of physical evidence that might conceivably be encountered in the investigation of a crime of violence. It has been found the field unit is capable of a maximum speed of 40 miles per hour over paved highways.

It is the plan to provide modern, improved, "on-the-scene" facilities for the recovery and preservation of physical evidence as an aid in investigations. Material so gathered may later be an aid to the district attorney in the preparation for trial of criminal matters of the first magnitude. It has been suggested by the fact that only meager facilities are too often available to the local enforcement officers primarily in the rural sections, not only of Wisconsin but of all other states as well. Behind the idea of the field unit is the firm conviction of the superintendent that to provide modern methods for the collection and preservation of physical evidence will result in a more exhaustive treatment of physical evidence encountered by the enforcement officers and also will be of material assistance to the district attorney and the trial court as well where a criminal matter is later brought before it. Oftentimes the principal issue in a criminal investigation may turn upon a small piece of physical evidence. If the enforcement officer does not have adequate

facilities for properly collecting and preserving this physical evidence, its value in the establishment of facts later may be seriously impaired or lost entirely. Thus the prime objectives of any enforcement agency, as well as the ends of justice, may be defeated.

There will be provided in the field unit the facilities to permit the field unit personnel to make a very limited preliminary evaluation of certain types of physical evidence such as seminal stains or stains suspected of being blood. In such cases, however, it is the considered opinion of the superintendent that the final determinations which might be desired can best be made in the laboratory in Madison where the proper facilities are provided, permitting a thorough and exhaustive examination and evaluation to be made by properly qualified technical personnel. All preliminary evaluations made by the field unit personnel will be subject to later confirmation and exhaustive examination by the laboratory in Madison.

The field unit equipment will provide proper containers for various types of physical evidence which may be encountered, ranging from suitable containers for the vital organs of a person whose body may be autopsied by a pathologist or surgeon to envelopes and rigid containers for objects encountered such as hairs, dirt or dust, clothing, liquids, fired bullets or fired cartridge cases (Fig. 3).

Photographic equipment, including cameras, tripods, and illuminating devices, will be included in the truck (Fig. 4). This photographic equipment will consist of a 4 x 5 Speedgraphic camera with a synchronized flash gun; a 4 x 5 view camera with synchronized flash gun; a fingerprint camera, and a collapsible tripod suitable for use with two of the three cameras previously mentioned. A wide angle lens for use in either Speedgraphic or view camera, highly desirable for taking crime scene photographs, is also included.

Space has been arranged in the interior of the field unit truck so that a very small, compact dark room (Fig. 5) has been provided and it is intended to use this dark room solely for the purpose of either loading cut film or developing

negatives which may be made at a crime scene. In this dark room is a unique device which will permit the development of photographic negatives at the proper temperature, 68.5 degrees Fahrenheit, by including in the field unit itself the smallest type sealed mechanical refrigeration unit that is obtainable. This refrigeration unit is capable of lowering the temperature of a stainless steel surface plate approximately 9 x 18 inches, on which the developing trays are placed. The reason that it is thought well to develop black and white negatives which are of importance and may be taken at a crime scene is that despite care and precautions that may be taken, synchronizers, shutters, etc. being mechanical devices, sometimes do not function as intended. It is thought that if in the event an important photographic negative is taken and it is later found after the development of the negative in Madison that the exposed negative does not include the subject matter desired, it may be impossible to retake this negative. For this reason, in all cases where a black and white exposure is made which may possibly be important in the trial of a criminal case, the negative will be developed in the field unit immediately following the exposure of the negative. It is not intended that any contact prints or enlargements will be made in this very small dark room, and as has been stated, it will only be used for the "pan" development of negatives. All other photographic work will be done in the laboratory at Madison.

Provisions are being made at the laboratory in Madison to process color negatives where the taking of color pictures in the course of preservation of physical evidence presents a distinct advantage over the conventional black and white photographs. The field unit complement of film will include a limited number of sheets of color film in the 4 x 5 size. Either of the two 4 x 5 cameras (Fig. 4) in the truck may be used in making color photographs at crime scenes. Aside from the value that good color photographs have in certain aspects of the trial of criminal matters, the provision to make color photographs of specimens of interest to the pathologist at the time an autopsy is performed will provide an excellent source of reference and research material for the University Medical School. This will be particularly true

where specimens are encountered or conditions are encountered which are of particular interest to the specialist in the field of pathology and legal medicine.

The truck has been arranged so that glass wool has been used as heat insulating material in the walls and ceiling of the truck. A heater has been provided in the truck which will contribute to the operating efficiency and comfort of the operator and also in winter weather will eliminate the possibility of solutions or evidence carried in the truck freezing and being destroyed.

Included with the equipment in the truck is a portable X-ray unit which will be available in the event an autopsy surgeon or pathologist desires to make a fluoroscopic examination of the body of a victim in a murder case for the purpose of locating foreign bodies or missiles that may be in the victim's body. Provision has been made in the truck for a gasoline-driven power supply capable of operating the portable X-ray equipment previously referred to, floodlights, or electrically-operated emergency equipment. This unit has already been used as an aid in the identification of unidentified bodies in crimes and disasters.

The gasoline-driven power supply unit (Fig. 9) in the truck in addition to providing heat for the interior of the truck in the wintertime also provides 12-volt current for the operation of a three-channel, crystal-controlled, 30-watt, FM radio transmitter (Fig. 5) capable in emergency situations of communicating with approximately 90% of the police and sheriffs' departments in any county in the state, thus providing a local emergency direct "tie-in" with a majority of sheriffs' offices or police departments radio-equipped with FM systems. A communications receiver of high sensitivity which is "tunable" to cover continuously the high frequency radio spectrum with regard to either AM or FM radio from 25 megacycles to 165 megacycles has been included in the field unit. Supplementing this equipment, there is a regular 50-watt crystal-controlled two-way FM receiver and transmitter included in the field unit which operates on the state traffic network frequencies. Further, in connection with radio equipment, the truck will be equipped with two battery-powered "Walkie-Talkie"

units (Fig. 7) operating on the state traffic frequency. These two Walkie-Talkie units will provide portable self-contained facilities with which a temporary emergency radio network may be set up either between the truck and either of the Walkie-Talkie units, or independent of the truck between either of the two Walkie-Talkie units, or with any radio-equipped car operating on the state traffic frequency. To further facilitate emergency uses, which may include air-ground operations, the top of the truck carries the lettering "WSCL Field Unit I," which will aid in its location and identification by aircraft. Included in the unit is a Veri pistol (Fig. 7) with colored parachute flares for night signaling. A portable storage battery operated 25-watt electric megaphone (Fig. 7) capable of projecting the voice one-half mile is intended for use by the field unit personnel in controlling crowds or arranging surrender of persons barricaded in a building.

Further, with regard to electrical equipment in emergency operations of the truck, floodlights (Fig. 9) which can be operated either from the truck power plant referred to or from a small separate portable gasoline-driven unit, which is sufficiently small and light so that it may be operated in a row boat, have been included.

Specifically referring to the principal power unit in the field unit truck, it is a gasoline-driven air-cooled power unit (Fig. 9) capable of supplying continuously 3,000 watts of 110-volt, 60-cycle, single-phase power. For short periods of time it is capable of supplying 4,000 watts of power. In addition, a 12-volt D. C. system is also powered from the same gasoline-driven prime mover. This is for the operation of emergency floodlights, radio equipment, lights, etc.

In addition to the floodlights referred to, there are battery-operated hand lanterns which are self-contained and are standard equipment in enforcement vehicles and are used for examining crime scenes at night or under reduced conditions of illumination.

Among the unique pieces of equipment which are to be included in the field unit is an Army mine detector of the magnetic type (Fig. 8). This mine detector is

capable of detecting ferrous or magnetic materials which may be buried or hidden in sand, dirt, straw, or grass to a depth of approximately 18 inches where the object being searched for is a knife, a gun, or similar iron or steel object.

A magnetic lifting device (Fig. 8) is also included to facilitate the recovery of knives, rifles, shotguns, handguns, and other magnetic objects which may be deposited in bodies of water.

There will be available for shipment from Madison when needed a recently-developed improved dragging equipment which has been found to be superior to the ordinary grappling hook. This equipment will be made available from Madison when needed and will be used by the field unit personnel in attempts to recover bodies from lakes or rivers.

We have under construction at the present time a unique underwater optical viewing device that will permit the thorough visual examination of the bottom of a body of water from a boat up to a depth of approximately 10 feet. This is possible without disturbing the bottom. In searching the bottom for guns, knives, or bodies which may be deposited in the body of water, this underwater viewing device the superintendent hopes will prove to be more effective and more economical than dragging, diving bell, or diver operations for the purpose of recovering any such materials which may be deposited in relatively shallow water. The underwater viewing device will be equipped with low-voltage, "sealed-beam" spotlights which will illuminate the bottom area being searched.

We have under construction for inclusion in the truck a motor-driven screening device which will permit the rapid sifting or screening, visual and magnetic searching of contents of furnaces, dirt, or ashes in seeking fired bullets, shells, bone fragments, or metal objects, such as metal buttons, clothing fasteners or shoe eyelets, shoe nails, screws, tools, or a bludgeon, recovery of which may be of considerable value where the investigation involves the searching of dirt, ashes, or the contents of a furnace.

It is anticipated that later there will be added in the equipment of the truck oxyacetylene cutting equipment which will be useful in emergency situations or will be helpful in removing parts of safes or bars which may have been tampered with and which contain tool marks made in effecting forcible entry by cutting bars over windows, doors, etc., in the commission of a burglary.

A reasonably complete set of hand tools (Fig. 6) has been included in the field unit equipment in order to facilitate the removal of fired bullets from the walls, ceilings, floors, etc. where a shooting has taken place or an assault been committed. These tools will also be used to remove window bars, parts of locks, or safes that have been tampered with in the commission of a burglary.

A vacuum cleaner equipped with a special attachment permitting removal and collection of dust and occupational dirt from the upholstery of automobiles or from the clothing of persons under investigation has been included. The occupational dust, dirt, and other microscopic evidence thus recovered will be placed in clean containers and later will be examined and analyzed in the laboratory at Madison.

Included in the equipment of the field unit truck is a small cylinder of "bottle gas," which makes possible the use of a bunsen burner (Fig. 2) which will be used in the performance of certain tests that may be made in the field unit.

Miscellaneous standard items of equipment such as fingerprint equipment and apparatus intended for making visible latent fingerprints, equipment for taking inked impressions of either suspects or persons under investigation, or in cases involving death makes possible the fingerprinting of the victim by latest and best methods for purposes of identification (Fig. 3). There will also be included materials and equipment that will make the preservation of foot and tire impressions possible by improved three-dimensional casting methods, in mud, dirt, dust, or snow. Plastic-coated rope and a set of steel stakes have been included, as have four 10-foot by 10-foot zippered tarpaulins for temporarily protecting crime scene areas of 400 square feet during inclement weather.

It has been decided that it is neither economical nor desirable to include in the equipment of the truck a lie detector or polygraph. These tests will be conducted when arrangements have been made previously with the laboratory in Madison and are not a part of the field unit's operations.

The maximum flexibility and service obtainable with the truck with regard to dispatch is provided through the two-way radio equipment, some of which, as has been stated, operates on the state traffic frequency through the state traffic network and provides the field unit with a constant two-way radio contact with some one of the state traffic transmitters, regardless of what part of the state the truck may be in. This obviously will increase considerably the speed and effectiveness of dispatch of the field unit.

It has been decided that requests for assistance that the field unit might render to enforcement agencies must be directed to the superintendent of the laboratory, located at 917 University Avenue, Madison 5, Wisconsin, telephone 6-4411, extension 693 or 694, or preliminary requests for information may be directed through the state traffic radio network addressed to the superintendent of the laboratory, extension 693 or 694, Capitol Building, Madison. It has been decided further that since only one field unit is available, dispatch of the unit and the participation at the request of the local enforcement agencies should be cleared first through the district attorney of the county in which the investigation is being conducted, and second that the field unit's participation must be confined to criminal investigations where a death or deaths have resulted or crimes of violence have been committed against a person or persons where such crimes of violence have resulted in death or serious injury to the victim which is likely to cause death. In cases of the type just described the enforcement agency administrative officer who is primarily concerned with the investigation and who feels he needs the assistance that can be rendered by the field unit should first communicate with the district attorney of the county in which the investigation is being conducted. The request for assistance will then be either transmitted

by the investigating agency or the district attorney to the superintendent of the laboratory. There is one exception to the conditions just stated and this is based on the following: in cases where it is felt that the field unit will be of assistance in emergency situations, such as explosions, large fires suspected of being of incendiary origin, falling buildings or crashed aircraft. A request growing out of a situation such as this will be honored where possible, since these matters usually become a matter of great public concern, and the unique emergency facilities provided by this field unit have already proven in several instances to be indispensable. In such cases the request for the field unit's assistance should be directed to the superintendent of the laboratory through the district attorney of the county in which the disaster has occurred.

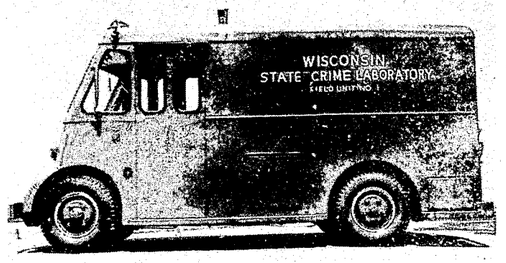


Fig. 1

Left side of 1½-ton front-wheel drive Mobile Field Unit.

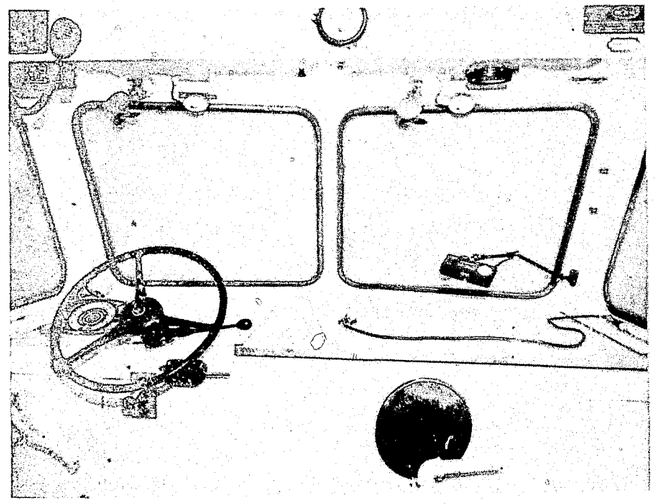


Fig. 2

Facing work table in front of Mobile Field Unit.

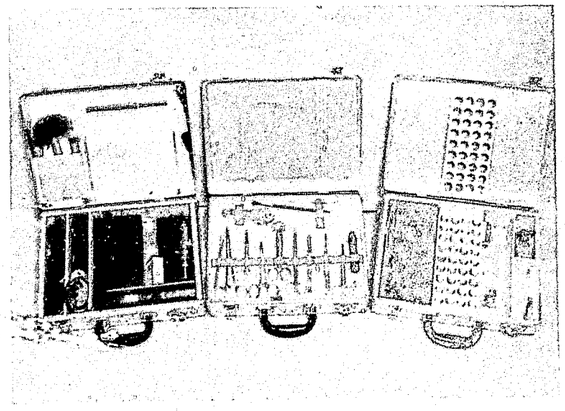


Fig. 3

Left - Fingerprint Kit

Center - Scalpel, tweezers, scissors, etc. for recovery of microscopic evidence.

Right - Vials and small bottles for recovery and preservation of liquids, debris, and microscopic evidence.

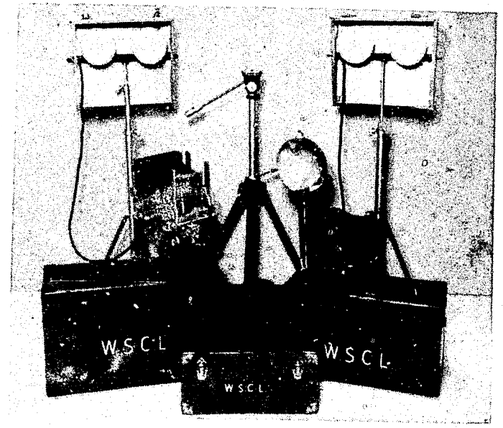
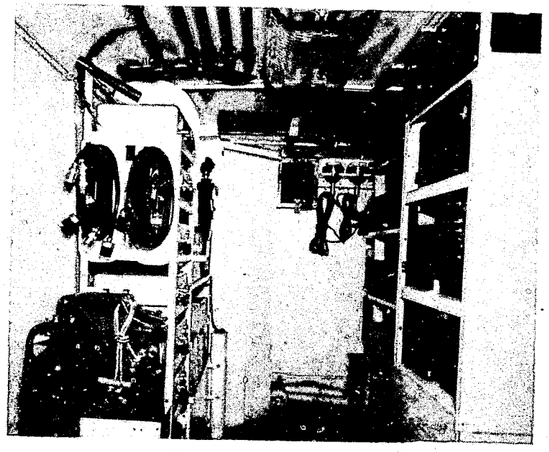


Fig. 4

Cameras and portable illumination apparatus.

Fig. 5

General view of interior facing rear of field unit, radio equipment, and power plants in racks at right.



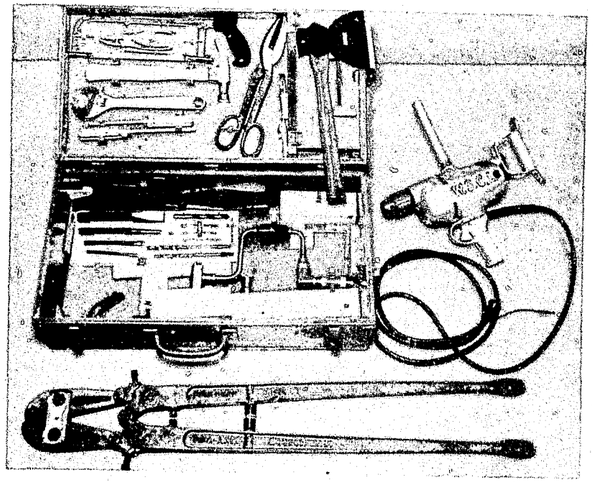


Fig. 6

Tools carried in field unit for recovery of physical evidence, including bolt cutter, electrically operated drill, chisels, wrenches, etc.

Fig. 7

Left - Portable signaling equipment including two Walkie Talkie units operating on State Traffic emergency frequency.

Center - Veri Pistol

Right - 25-Watt portable electric megaphone.

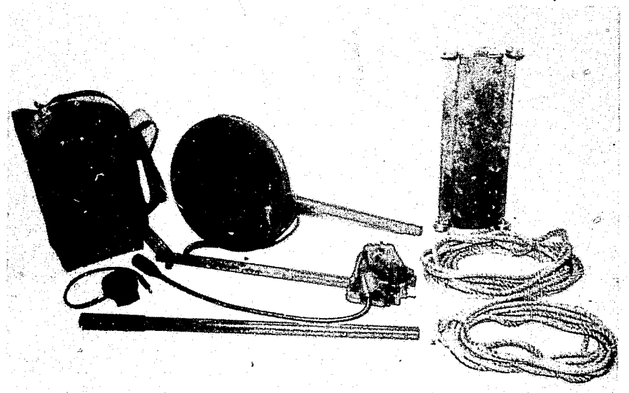


Fig. 8

Aids for location and recovery of metallic (iron or steel) objects.

Left - Magnetic mine detector.

Right - Permanent magnet recovery device.

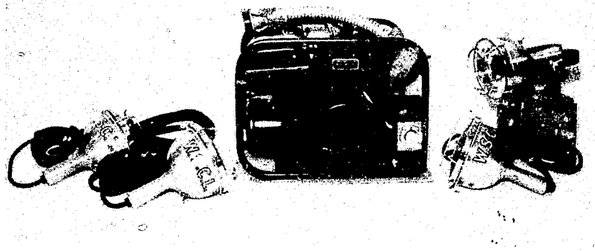


Fig. 9

Portable lighting equipment carried in field unit including gasoline-driven generator which can be used for operation of low voltage emergency lights shown.

WISCONSIN STATE CRIME LABORATORY
917 University Avenue
Madison 5, Wisconsin

CASE DATA FROM SUBMITTING ENFORCEMENT AGENCY

Date _____ 19____

(1) NAME OF VICTIM.....(2) Age .....(3) Sex.....

(4) Victim's Condition: Unharmed? Injured? Dead?

(5) TYPE OF CRIMINAL OFFENSE.....

(6) DATE OF OFFENSE.....(7) TIME .....

(8) Place where crime committed (city, town, etc.).....(9) County.....

(10) Exact location.....

(11) Name of SUSPECT (s), if known.....

(12) Suspect (s) in custody? Unknown? At large? Released on bond?

(13) Has the district attorney been advised of this offense and investigation?.....

(14) Name of person requesting laboratory assistance.....

(15) Title.....(16) Agency.....

(17) List of Evidence Recovered:

(18) Detailed facts of complaint and offense:

(Please use reverse side if additional space is needed)

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Part II

PHYSICAL EVIDENCE -- INVESTIGATIONS

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

THE COLLECTION, LABELING, PRESERVATION, AND PACKING OF PHYSICAL EVIDENCE

The purpose of this portion of the manual is to bring before the investigating officer the suggested procedures for the proper collection, labeling, preservation, and packing of physical evidence. It is arranged to afford easy reference for the information contained and the suggested procedures relating to the several kinds of evidence considered. The purpose is not to present detailed information concerning the actual examinations performed in the Laboratory, but rather to suggest such steps that may be taken by investigators in the field in the important matter of the recovery of physical evidence preparatory to submission for examination, so as to increase the efficiency both of the enforcement agency and of the Crime Laboratory.

The Crime Laboratory obviously cannot solve all of the problems with which the investigating officer is confronted. But informed law enforcement officials readily recognize that valuable contributions are being made by modern crime detection methods in the improvement and effectiveness of law enforcement today. It is believed that the Laboratory has the facilities to process physical evidence better than does the officer in the field.

In a recent case, in which the Laboratory was able to provide assistance, certain items of clothing were recovered from a burglary suspect, and the investigating officer attempted to recover the debris from the suspect's trouser cuffs using the best methods available to him. The same trousers were subsequently submitted to the Laboratory for examination and were swept with a vacuum sweeper using an especially constructed dust-collecting device (see Fig. 3). From the trouser cuffs firewall and safe paint identical to that from the crime scene were isolated which the officer had not removed or recovered.

The practicability of the use of this method to remove dust and debris from clothing was brought forcefully to light in another recent case. The perpetrator of a burglary, committed in the early morning hours, took his clothing to the cleaners as soon as they opened in the morning. This fact was divulged as a result of the investigation, and the clothing was submitted to the Laboratory for examination. The clothing was swept with the vacuum sweeper with the dust-collecting device, and the debris recovered was examined microscopically. Firewall and paint fragments identical with those from the burglarized safe were found to be present in the debris from the clothing--even though they had been dry cleaned.

A further word of caution: submitting evidence in criminal matters to individuals or to laboratories not accustomed to using

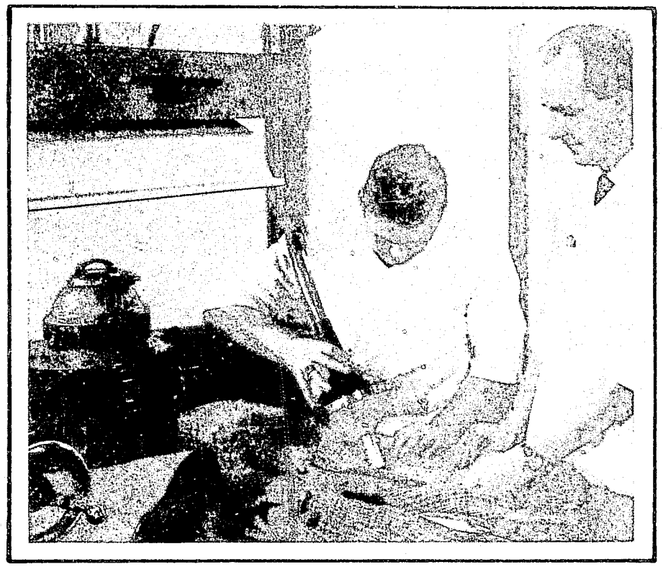
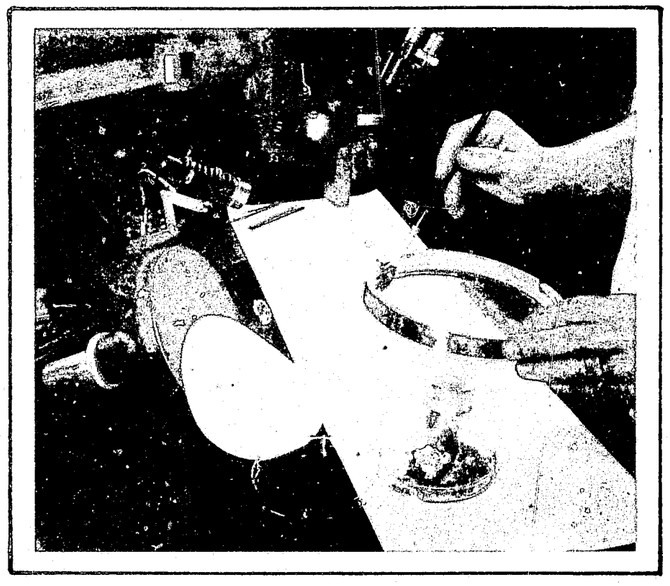


Fig 3 USE OF VACUUM SWEEPER TO RECOVER DEBRIS

The vacuum sweeper is used in conjunction with the dust collecting device to remove debris from clothing.

The dust collecting device separates at the middle and the debris is readily collected in a glass dish for examination with the microscope.



Source: Wisconsin State Crime Laboratory

the proper methods as those used in examining physical evidence may result in the total destruction of the evidence and/or inaccurate results. A case in point involved a sex offense committed on a bed. The bed sheet was submitted to and examined by, a laboratory which reported no seminal staining or spermatozoa present on the sheet fabric. The sheet was subsequently submitted to the Laboratory, and seminal material was found to be present (see Fig. 4). If the investigating authorities had not elected to submit the evidence to the Crime Laboratory, but had guided their actions by the results given by the first laboratory, the entire outcome of the investigation and successful prosecution may thereby have been defeated.

General Explanatory Note on the Tables

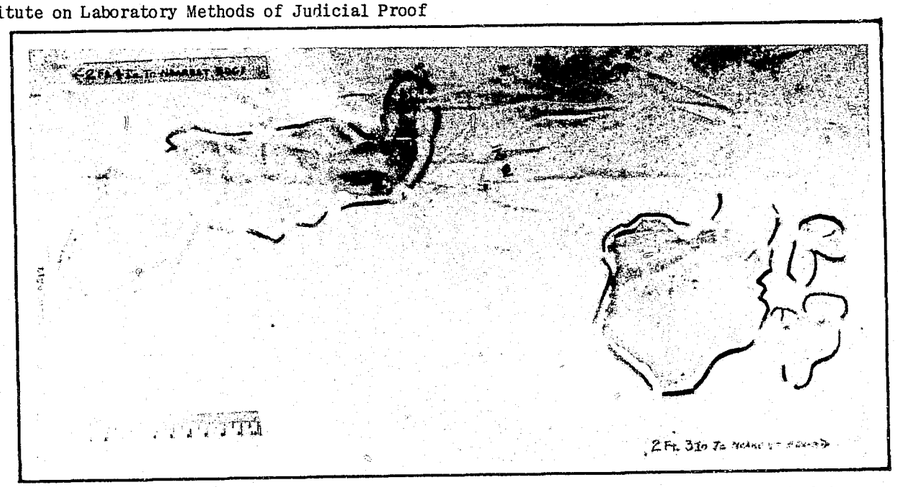
This section contains tables and illustrations designed to present in a condensed form, information that the investigating officer will find pertinent. To be used to best advantage the tables should be placed side by side, but the limitations of mimeographing made this impracticable. Consequently it has been necessary to place these tables as near as possible to the appropriate text. Tables I and II, therefore, immediately follow the textual discussions. For convenience, the illustrations have been grouped at the end of the section. Two general points may be noted about the tables: (a) the Roman numerals and letters in each table refer to the same types of evidence so that cross referencing may be done easily, and (b) the instructions in the tables necessarily provide only a minimum amount of information, thus additional information may be needed in some instances (such as the collection of soil samples, the taking of photographs, etc.).

General Instructions on Evidence

Some general instructions apply to the evidence discussed in both tables. Briefly, these instructions are:

1. Record to be kept by sender:

   (a) name of case
   (b) detailed description of source of each item of evidence submitted
   (c) date, time, and place of recovery
   (d) date and time of submitting material to laboratory
   (e) name of person recovering
   (f) how preserved and packaged
   (g) marks made on evidence for identification purposes
   (h) copies of all photographs taken in the course of recovery



Above is a photograph, taken using ultra violet light, of stains on a sheet upon which an attempt was made to commit rape. The dark lines about the stains are wax pencil marks made by the examiner.

Fig. 4 DEMONSTRATION OF PRESENCE OF SEMINAL STAINS AND SPERMATAZOA

At the left is a photomicrograph taken through the microscope showing spermatazoa at approximately 450X, which were isolated from the stains shown above.

Source: Wisconsin State Crime Laboratory

2. Information to be included on labels attached to evidence container:

   (a) name of case
   (b) contents of container giving source of contents
   (c) date and time of recovery
   (d) person recovering (name or initials)

3. Ship via:

   (a) registered mail
   (b) parcel post
   (c) express
   (d) messenger

Table I presents the potentialities of the Laboratory, listing what information may be expected from the examination of the respective kinds of evidence and what is needed in the way of questioned and standard materials for examination or comparison purposes. This table and the accompanying text will suggest to the enforcement agency the best means for the collection of standard samples; however, occasions will arise where the suggested practices will not be adequate, such as in the sampling and collection of oil samples. It is suggested, therefore, that the investigator contact the Crime Laboratory whenever there is a question as to how to proceed in the collection of standard samples for purposes of comparison. Another column is included which indicates the advisability of taking photographs of the evidence prior to collection and/or submission to the Laboratory.

Following Table II are Figures 6 through 10. These figures depict the suggested method for proper labeling, sealing, and packing representative types of evidence and containers. Reference is made to these figures in Table II. Figure 11 shows examples of proper packing methods as illustrated by evidence actually received at the Laboratory.

In Table II general instructions are given for the collection of the various kinds of evidence, for the labeling and preservation of the evidence, and for the packing of the evidence or the containers in which the evidence has been placed for shipment to the Laboratory.

Although the tables are largely self-explanatory, some discussion relative to the collection and preservation of standard samples for comparison purposes is necessary. In a majority of instances the task confronting the Laboratory is one of comparison as well as one of identification. Therefore, proper and sufficient materials for comparison purposes must be provided when a comparison seems likely. To cite an example: in an offense such as an assault where clothing fibers are discovered on the victim's garments, the

value of such evidence is practically negligible unless the suspect's clothing is made available for examination. The suspect's clothing presents fibers of a known source for purposes of comparison.

The Collection of Standard Samples

The discussion which follows is closely related to tables I and II and should be read in connection with them. The suggested procedure for collecting standard samples of the different kinds of evidence is as follows:

1. HAIR, HUMAN. Several factors are used in comparing hair from one person's head with a questioned hair sample. In each case, however, considerable variations of these factors exist in the hairs from one person's head. It is therefore necessary to examine many hairs from that person's head to determine the extent of such variations. In collecting hair samples from both living and dead persons, it is suggested that the officer take a clean comb and comb the subject's hair several times. The hairs obtained in this manner are consequently whole from root to tip. One should not cut the hairs from the head of the subject unless absolutely necessary, as it was found in the investigation of several murder and rape cases that the length of the hair shaft was of considerable importance. A representative sample is considered to be 50 hairs. If it is not possible to recover the required 50 hairs by combing, it then becomes necessary to cut the rest. In cases where it is suspected that poisoning has taken place with the use of arsenic, both hair and fingernails must be examined. The kind of sample required is different for this purpose, and the reader is directed to the section, "Instructions for the Submission of Material for Toxicological Analysis." Many times in rape cases pubic hairs play an important role. The method of collection is the same, but two dozen hairs are considered to constitute a representative sample. In the collection of pubic hairs the physician or the person collecting the hairs should be on the lookout for foreign material adhering to the hairs. When such material is found it should not be disturbed, and the hair or hairs should be cut.

2. HAIR, ANIMAL. Animal hairs encountered in cases may prove to be important evidence. Animal hairs may be categorized into domestic, commercial, and wild. Domestic or farm animals, such as dogs, cats, horses, cows, and the like, provide the bulk of the domestic animal hairs recovered as evidence. Commercial hairs, such as fox, muskrat, beaver, mink, and many others, are often dyed and where recovered provide a distinctive kind of evidence. Of the wild animal hairs, squirrel, rodent, and deer are perhaps the most common. When any of the hairs mentioned above are found, it is necessary, particularly in the case of commercial hairs, to have a representative sample of hairs from a suspected source. Most animals

have two kinds of hair. The most obvious is the fur hair proper, or the coarser hairs of the coat; the second type is the finer hairs or the guard or pelt hairs. In collecting a sample from the coat of a live or dead animal or of a fur coat, it is suggested that one pass his fingers through the fur hairs while holding them tightly together. In this manner loose hairs will be obtained. A minimum of two dozen hairs of each type, fur and guard hairs, should be taken. The hairs should not be cut unless absolutely necessary.

3. CORDAGE FIBERS. Rope fibers are found on occasion in several different types of crimes, such as murder, suicide, assault, burglary, and so on. Wherever possible the rope suspected of contributing the fibers, or that is suspected of having been cut or broken from another piece, should be sent to the Laboratory. If this is done, such a sample presents sufficient standard fibers for comparison purposes and at the same time allows an examination to be made of any debris that may be adhering to the rope itself. In the past such an examination has proven very fruitful, particularly when it reveals the suspect's occupation. On occasions the weave of the rope is of importance, and it then becomes necessary to obtain and submit whole rope sections for comparison purposes. The length of the rope, in this instance, must not be less than one foot. Oftentimes the ends of the rope provide a means of determining if another piece has been broken or cut from it. One must be particularly careful in this instance to handle the rope so as not to disturb the rope ends. The original cut or broken ends must be marked (such as with a string and tag) indicating which end is the original and which end was cut by the investigator. It is suggested that the ends of the rope, when the rope is recovered, be protected by encasing them in a glassine envelope (see Figure 6, container No. 12, which is available in several sizes), and that the rope is handled as little as possible.

4. BLOOD. When any crime has been committed in which blood has been let by any of the parties involved, a blood sample should be collected by a physician or nurse. A sample should always be taken from the victim and any and all suspects. A quantity sufficient for typing purposes or any other necessary tests is considered to be one-third (1/3) fluid ounce or about 10 cubic centimeters. Where determinations are to be made of the carbon monoxide or alcohol content of blood, it is necessary that the container be filled to the top in order to minimize the amount of air above the top of the liquid. All blood samples should be preserved by the addition of sodium citrate. All samples should be refrigerated when possible. Figure No. 5 illustrates the proper method of blood preservation.

5. GREASE, OIL. Where grease or oil are involved in a criminal offense it is not often that there are suspected sources. If there is a suspected source, as in the instance where the unknown material is suspected of being hair oil, the entire bottle containing the hair oil suspected of being the source should be sent to the

Laboratory with the unknown material or stain. Most frequently grease or oil as evidence will be in the form of staining. Foreign material entrapped in the stain may be of considerable importance (e.g., metal filings, botanical material, etc.). In this event, consideration must be given to the possible source of such foreign material.

6. PAINT. Paint is a very common type of evidence and is often encountered in the form of fragments. The most common offenses in which it is found are burglary and hit-and-run. Where fragments are recovered it is necessary to have sufficient fragments from the suspected source to show the variations in layers, layer color, and thickness. It is not uncommon for some surfaces, such as automobile bodies, safes, and wooden surfaces to have several coats of paint, varnish, or lacquer, and to be unevenly painted. In such instances the paint fragments from these surfaces are distinctive and where a match is obtained, the possibility of the questioned fragments coming from some other source is very remote. It is suggested that, in collecting standard samples, one take the fragments from around the damaged area. It is occasionally possible, such as in hit-and-run cases and safe burglaries, to match the fractured edges of the fragments and in this way prove the source of the questioned fragment. If the paint is in the nature of a smear or stain, the suggestion is that the source of the staining was wet at the time of staining. The suspected source may be a can of paint or a freshly painted surface. Where a can of paint is recovered and is suspected of being the source of a stain it is suggested that the entire amount, can and all, be sent to the Laboratory. The exception to this is where the quantity is in excess of one quart. If this is the case, the contents of the larger container should be thoroughly stirred with a clean stick and immediately poured into a clean container so as to provide one quart for comparison purposes. All of the pertinent information relating to the brand, type, and chemical composition (often printed on the label) of the paint should be recorded and this information transmitted to the Laboratory with the sample.

7. CLOTHING. Clothing or clothing fibers are present as physical evidence in many kinds of offenses. The most obvious of these offenses are murder and the other assault-type offenses, burglary, sexual offenses, and hit-and-run. Clothing may be involved as the result of finding clothing fibers, impressions (as on the painted or lacquered surface of an automobile in a hit-and-run case), and tears or rents in the fabric of the garment itself. Wherever this is the case it is imperative that the entire garment be sent to the Laboratory for comparison purposes. It is advisable to send all of the articles of clothing belonging to the victim and

the suspect(s) worn by them at the time the crime was committed. Much information can also be learned from an examination of the debris from the clothing in the cases suggested as examples above.

8. GLASS. Glass is another common type of physical evidence. It is most often found in hit-and-run cases and burglaries. The examination of glass falls into two general categories. First, the physical and optical properties and the chemical composition of the glass itself are determined; second, the questioned fragment(s) may be fitted mechanically to the broken edge of a portion of the known sample, or information regarding the nature, size, and relative speed (such as bullets) of an object causing a penetration of the glass may be determined. It is because of these types of examinations that it is suggested that all of the glass fragments obtainable from the known source (automobile headlights, window panes and the like) be recovered and sent to the Laboratory.

9. METAL. As in the case of glass, it is possible to compare metals on the basis of their chemical composition and the irregularities produced when a piece of metal (e.g., tool, automobile ornaments, etc.) is fractured. Also the use of advanced techniques in the examination of metal specimens, such as the application of metallography, crystallography, and X-ray diffraction may provide information of importance to the investigation or prosecution of criminal cases where metal is involved as evidence. Metal fragments, like glass fragments, adhere to clothing fabrics or fall in pockets and trouser cuffs. Therefore, wherever metal is known to be, or suspected to be, involved as physical evidence in an offense, the entire object or objects supposedly contributing metal fragments should be sent to the Laboratory.

10. WOOD; BOTANICAL SPECIMENS. Painted and unpainted wood fragments are frequently found in the debris removed from trouser cuffs, pockets, shoes, tools, and the like. The most frequent offense in which this kind of evidence is found is that of burglary. In order to be able to say that a certain wood fragment came from a certain window sash or door frame, it is necessary to have a representative sample of the sash or frame with which to compare the fragment. It is suggested that where wood, painted or unpainted, is damaged in the commission of an offense, a section of the damaged surface (near the damaged area) at least one inch deep, two inches wide, and three inches long be removed and sent to the Laboratory. Where botanical specimens are involved, such as commercial seeds (oats, barley, wheat, and so on), shrubs, trees, and the like, it is advisable to send the Laboratory at least six seeds of any one kind, and at least two leaves from any one kind of shrub or tree.

11. MATERIAL FROM FINGERNAILS. Material found deposited beneath the fingernails of an individual may contain a myriad of things. In some instances evidence is found that has a bearing on an offense

under investigation. It should be standard practice to take the material from beneath the fingernails of both the victim and all suspects in all cases involving violent personal contact, such as murder, assault, and rape. Toothpicks or splinters from tongue depressors may be used to remove the material from beneath the fingernails. A clean toothpick or splinter must be used for each fingernail, and the instrument placed in the container (vial, or druggist's fold) with the debris. Debris from each finger should be separately wrapped and packaged. When this is done, information regarding the person's employment should be forwarded to the Laboratory.

12. SOIL. With advanced techniques it is possible to show that soil found on the shoe of a suspect actually came from a certain spot at the scene of the crime. The method of comparison is so sensitive that the problem of sampling becomes very critical. The task of collecting proper and sufficient samples for purposes of comparison rests again with the investigating officer in nearly every instance. The "questioned" sample is usually found on the suspect's shoes, often in the area of the instep and at the juncture of the sole and the upper. The clothing of the suspect should not be overlooked as a possible location of soil, particularly in rape cases. It is not infrequent that the suspect will claim to have obtained the soil from some specific location. In that event it is advisable to obtain a soil sample from there, if possible, so that it may be compared with the soil sample removed from his clothing and with the samples collected from the scene of the crime. The procedure given below presents what is considered to constitute sufficient samples of soil for comparison purposes:

Sample Number	Take Sample From:
1	Starting point, (e.g. footprint, see below)
2	five paces north of footprint.
3	five paces east of footprint.
4	five paces south of footprint.
5	five paces west of footprint.
6	twenty-five paces northwest of footprint.
7	twenty-five paces northeast of footprint.
8	twenty-five paces southeast of footprint.
9	twenty-five paces southwest of footprint.

The starting point, Sample No. 1, should be the most likely spot for the suspect to have acquired the soil on his clothing. This may be a footprint, flower bed, trampled area, or the like. If the most likely spot is a footprint, the sample should be taken from that part of the print corresponding to the location on the shoe from which the questioned sample was taken (after the casting has been completed, if undertaken). It should be standard practice to make

a sketch of the area showing the point from which each sample was collected. A copy of this sketch should accompany the samples when they are submitted to the Laboratory for examination. The amount collected in each sample should total one ounce or more and should consist of the top soil; it is unnecessary to go deeper than one half to three quarters of an inch from the surface of the earth.

Discussion of Table II

The contents of Table II are mostly self-explanatory, but special instances may arise which suggest different handling of the evidence. The following paragraphs present some examples of these exceptions to Table II:

1. HAIR. When animal and human hair, or any fibers or foreign material are found adhering to an object, such as an ax or hammer, it is suggested that the investigator not remove them but send the entire object to the Laboratory with the foreign material in place. Since it is always imperative that the object reach the Laboratory in exactly the same condition as it was discovered, certain precautions must be taken in packing it for shipment. It is suggested that the object be securely fastened to a perforated board (such as a piece of quarter-inch plywood) with heavy string or wire and packed in a tightly fitting box. No other item or article should be packed in the same box. In the case of smaller objects it is practicable to secure the object in a clean cigar box and then pack the cigar box in a larger box for shipment.

2. BLOOD. If fresh blood is obtained it is advisable to treat it to prevent clotting. To do this, add to the blood sample (e.g., about one-half of an ounce, fluid) a small amount of sodium citrate (about the size of a kernel of corn), which can be obtained from a druggist. (See Fig. 5.) If the amount of the blood is relatively small (less than one-sixth of a fluid ounce, or about five cubic centimeters), one should add about 20 drops of physiological saline from an eyedropper. Physiological saline may be approximated by adding about two heaping teaspoonfuls of table salt to a quart of water. If the stain is on clothing or on any other object, it should be allowed to air dry without the aid of a fan.

3. VEHICLES. Not infrequently an automobile or truck is recovered and suspected of being involved in the commission of a crime. In hit-and-run cases the underpinnings of the vehicle become important and must be carefully searched for hair, clothing fibers, tissue, blood, and scuff marks. In the case of burglary the interior of the vehicle must be carefully searched, particularly in the case of safe burglaries. In such cases it is suggested that the interior of the vehicle be sketched, marking it off in quadrants for five and six passenger automobiles and in halves for three passenger automobiles. On the sketch the location as well as the

type of objects found in the vehicle should be noted. The seat and floor surfaces of each quadrant or half should be swept with a clean whisk broom and the debris from each placed in clean glassine bags or wide mouth bottles. (See Fig. 6, containers No. 2 and 12.) Do not use envelopes because the quantity of material recovered is usually great, and there is a tendency for the material to leak out. Each container should then be properly sealed (see Figs. 6 and 7). The seats should be removed and any material appearing to be connected with the commission of the offense should be placed with the debris from the quadrant in which the material was found. The exception to this is, of course, where an object has an obvious and important connection with the investigation of the case and thus warrants being placed in a separate container. Wherever practicable, it is suggested that the vehicle be made available to the Laboratory for processing. (The reader is referred to the "Checking Exterior Surfaces of Automobiles and Vehicles in Hit-and-Run Cases.")

4. GLASS. When wrapping glass fragments for shipment or transmission to the Laboratory, it is suggested that each fragment be wrapped separately or placed in separate sealed envelopes. When all of the fragments are placed in one container there is a tendency for the edges of the fragments to become chipped. Where very small fragments are encountered, it is suggested that one place them in glass vials to prevent them from being lost. Where pieces of glass larger than the envelopes available are recovered, such as window glass, it is advisable to fasten the piece securely to a perforated board (such as 1/4 inch plywood) using heavy string, but not wire. The board and glass should then be placed in a clean cardboard or wooden box. No other items or articles should be placed in the same box. The same means of packing should be used for objects bearing possible fingerprints or bloodstains.

Tables I and II do not include all possible kinds of evidence that may be recovered at the scene of the crime. Any other kind of evidence that may be encountered can easily be placed in its proper place under the main headings in the tables and treated accordingly.

Whenever the occasion arises where the course of action is not clear insofar as the collection and preservation of physical evidence is concerned, the Laboratory at Madison stands ready to be of service. It will suggest and recommend proper procedures necessary to collect and preserve evidence; it will furnish advice relative to evidence needed for purposes of comparison; and it will assist in the actual collection and preservation of the physical evidence by means of the mobile unit (see Part I of this manual for an explanation of the mobile unit).

TABLE I

Guide Posts in the Collection of Evidence

KIND OF EVIDENCE	POSSIBLE LABORATORY DETERMINATION	MATERIALS REQUIRED BY LABORATORY*	SHOULD SCALED PHOTOGRAPHS BE TAKEN BEFORE EVIDENCE IS SUBMITTED?
I. HAIR and FIBERS			
A. Human Hair	A. 1. Whether or not hairs are possibly from specific individual 2. Physical nature of hairs, damage and/or additions, treatment.	A. 1. (Q) All of questioned sample 2. (S) At least 50 hairs from victim and suspect (See "Instructions, etc. for Toxicological Analysis.")	A. Yes. See footnote (a).**
B. Animal Hair	B. 1. Type of animal from which sample came 2. Whether hairs have been treated (dyed, etc.)	B. 1. (Q) All of questioned sample 2. (S) Representative (at least 24 hairs of each type and color) from suspected source	B. Yes. See footnote (a).
C. Clothing Fibers, Fabric	C. 1. Type of fiber 2. Whether or not fiber is of same color, shade, size, and shape as those from suspected source 3. Characteristics of fabric weave	C. 1. (Q) All of questioned sample 2. (S) Entire garment suspected of being source of fibers or fabric	C. Yes. See footnote (a).
D. Cordage Fibers, Rope	D. 1. Type of fiber 2. Whether or not fiber is of same size, color, and character as those from known source 3. Where sample is complete rope: dimensions, physical characteristics, and identification of adherent material 4. Whether or not one piece of rope was cut or broken from another	D. 1. (Q) All of questioned sample 2. (S) Entire rope from suspected source where practicable, for comparison purposes	D. Yes. See footnote (a).

*(Q) Questioned material
(S) Standard material for comparison purposes
** See last page of this table.

KIND OF EVIDENCE	POSSIBLE LABORATORY DETERMINATION	MATERIALS REQUIRED BY LABORATORY	SHOULD SCALED PHOTOGRAPHS BE TAKEN BEFORE EVIDENCE IS SUBMITTED?
II. STAINS			
A. Blood - Tissue	A. 1. Whether or not questioned stain is blood 2. Specific origin, human or animal 3. Blood group 4. Analysis of physical characteristics of staining 5. Tissue: above 1-4, plus type of tissue - muscle, brain, etc. 6. Alcoholic content of whole blood	A. 1. (Q) All of materials bearing stains 2. (Q) Flakes of questioned material 3. (S) Blood samples from victim and suspected persons (must be taken by physician or nurse)	A. Yes. See footnote (b).
B. Seminal Stains	B. 1. Whether or not stain is of seminal origin 2. Whether or not stain contains spermatozoa 3. Physical characteristics of stain	B. (Q) All of material bearing stain	B. No. See footnote (a).
C. Other Body Fluids	C. 1. Urine: Identification 2. Perspiration: Identification	C. (Q) All of articles or material bearing questioned stain	C. No. See footnote (a).
D. Feces, Fecal Stains	D. 1. Identification of stain 2. Identification of inclusions	D. (Q) All of material if in bulk	D. See footnotes (a) and (b).
E. Grease - Oil	E. 1. Identification of stain and physical properties 2. Identification of inclusions 3. Identification of oil in arson investigations	E. 1. (Q) All of articles bearing stain or suspected oil 2. (S) Bottle or container containing standard sample for comparison	E. No. See footnote (a).
F. Paint Stains	F. 1. Color, type, pigment size and other physical characteristics; chemical composition 2. Comparison with standard where indicated	F. 1. (Q) All of sample bearing stain 2. (S) At least one ounce and at the most, one quart of sample from suspected source for comparison purposes	F. Yes. See footnote (b).

KIND OF EVIDENCE	POSSIBLE LABORATORY DETERMINATION	MATERIALS REQUIRED BY LABORATORY	SHOULD SCALED PHOTOGRAPHS BE TAKEN BEFORE EVIDENCE IS SUBMITTED?
G. Miscellaneous Stains (eg., food)	G. 1. Identification as to kind, physical properties, and chemical composition 2. Physical nature of staining 3. Comparison with known material in some instances	G. 1. (Q) All of article bearing stain 2. (S) Representative sample of material suspected of being source of stain for comparison purposes	G. No. See footnote (b).
III. CLOTHING			
A. General	A. 1. Size and physical condition 2. Occupational debris, identification of 3. Other adherent materials possibly leading to identification of individual 4. Manufacturer's and laundry marks	A. 1. (Q) All clothing worn by victim 2. (S) Clothing worn by suspect or suspects where applicable	A. No. See footnote (b).
B. Tears, Cuts, and Penetrations	B. 1. Nature and physical characteristics of damage 2. Identification of adherent materials due to damage such as powder pattern, metal fragments, etc.	B. 1. (Q) Entire article of clothing containing damage 2. (S) If gunshot wound etc., weapon suspected of being used. (See The Wisconsin Sheriff Magazine, Vol. 1,No.9, Oct. 1948,pp.7-12)	B. No. See footnote(b).
C. Abrasions, Impressions	C. Whether or not clothing from known source could have made impression or abrasion	C. 1. (Q) Abraded surface 2. (S) If possible and practicable, the material bearing the impression or abrasion Clothing suspected of having caused impression or abrasion	C. Yes. See footnote (a).

KIND OF EVIDENCE	POSSIBLE LABORATORY DETERMINATION	MATERIALS REQUIRED BY LABORATORY	SHOULD SCALED PHOTOGRAPHS BE TAKEN BEFORE EVIDENCE IS SUBMITTED?
IV. MISCELLANEOUS MATERIALS			
A. Paint Fragments	A. 1. Order, thickness, and color of layers 2. Chemical, physical, and optical comparison with standard 3. Chemical composition 4. Particle size determinations and comparisons	A. 1. (Q) Entire questioned sample 2. (Q) All garments suspected of containing questioned material 3. (S) Representative sample from suspected source, including <u>all</u> paint layers	A. Yes. See footnotes (a) and (b).
B. Glass Fragments	B. 1. Physical properties 2. Mechanical comparison of fractured edges 3. Physical, chemical, and optical comparison with glass of known source 4. Metal plating, thickness, type, and irregularities	B. 1. (Q) Entire questioned sample 2. (Q) All garments suspected of containing questioned material 3. (S) All of sample from suspected source	B. Yes. See footnotes (a) and (b).
C. Metal Fragments	C. 1. Physical characteristics and metallurgical considerations 2. Chemical composition and comparison with material from known source 3. Identification of adherent material 4. Mechanical comparison of fractured edges	C. 1. (Q) Entire questioned sample 2. (Q) All garments suspected of containing questioned material 3. (S) Representative sample from known source	C. Yes. See footnotes (a) and (b).

KIND OF EVIDENCE	POSSIBLE LABORATORY DETERMINATION	MATERIALS REQUIRED BY LABORATORY	SHOULD SCALED PHOTOGRAPHS BE TAKEN BEFORE EVIDENCE IS SUBMITTED?
D. Wood Fragments, Wood, Botanical Specimens	D. 1. Identity as to type, genus, and specie 2. Whether or not identical as to type where comparison is indicated 3. Identity of inclusions or additives	D. 1. (Q) All of questioned sample 2. (Q) All garments suspected of containing questioned sample 3. (S) Sample from known source containing at least two growth rings (i.e., about $\frac{1}{2}$"x2"x3") 4. (S) Botanical sample from suspected source, including all integral parts (leaf, seed, flower, etc.)	D. Yes. See footnotes (a) and (b).
E. Material From Fingernails	E. 1. Presence or absence of blood If present, specific origin, human or animal and blood group 2. Identification of contents: epithelial cells, hairs, fibers, skin, etc.	E. 1. (Q) Entire questioned sample 2. (S) Blood samples from victim and suspected persons (must be taken by physician or nurse) 3. (S) Clothing of suspect or suspects, if available	E. No.
F. Soil	F. 1. Physical characteristics 2. Identification of inclusions 3. Comparison with samples (some known source)	F. 1. (Q) Entire questioned sample 2. (S) Representative sample from known source, plus additional standards from immediate area	F. Yes. See footnote (c).
G. Firewall	G. 1. Identity of components 2. Comparison with standard material	G. 1. (Q) Entire questioned sample 2. (Q) Clothing of suspect(s) 3. (S) Standard sample from safe body and safe door 4. (S) Submit floor sweepings from area where safe was damaged 5. (Q) Submit debris from automobile, if involved	G. Yes. See footnote (b).

KIND OF EVIDENCE	POSSIBLE LABORATORY DETERMINATION	MATERIALS REQUIRED BY LABORATORY	SHOULD SCALED PHOTOGRAPHS BE TAKEN BEFORE EVIDENCE IS SUBMITTED?
V. UNIDENTIFIED CHEMICALS			
A. Liquids	A. 1. Chemical composition 2. Physical and optical properties 3. Identification of inclusions 4. Comparison with known materials	A. 1. (Q) Entire questioned sample - maximum quantity desired 1 quart 2. (S) Representative sample from known source where comparison is indicated - maximum quantity, 1 quart	A. Yes. See footnote (b).
B. Solids	B. Same as in V. A	B. 1. (Q) Same as in V A Maximum quantity, 1 pound in each case 2. (S) Same as in V A 2, maximum quantity, 1 pound	B. Yes. See footnote (b).
VI. VEHICLES	1. Whether or not vehicle was instrumental in, or involved in commission of offense - identification of debris 2. Examination of paint, metal fractures, etc. (fabric impressions)	1. (Q) Debris from interior of vehicle, accompanied by sketch 2. (Q) If possible and practicable, send vehicle to laboratory. 3. (Q) Clothing of victim where indicated (hit-and-run) 4. (S) Paint sample from vehicle including all paint layers	Yes. See footnote (a), (b), and (c).

Footnotes (a) - photograph if item is adhering to or is a part of a surface that cannot be sent to Laboratory.
(b) - photograph before removing from crime scene.
(c) - photograph impressions and debris before handling (casting, etc.).

TABLE II

Instructions for Handling, Preserving, and Shipping Evidence

KIND OF EVIDENCE	GENERAL INSTRUCTIONS	LABELING AND PRESERVATION	PACKING FOR SHIPMENT
I. HAIR and FIBERS			
A. Human Hair	A. 1. Use clean fingers to handle hairs. 2. Do not wash or otherwise clean hairs. 3. Do not attach to any surface or cut hairs--allow to remain free in container.	A. 1. Place in clean glass vial or glassine envelope and seal as in Figs. 6 and 7. 2. Where clothing is involved, label as in Fig. 8 and do not handle excessively.	A. 1. Pack glass containers as in "A," Fig. 10. 2. Pack clothing as in Fig. 8. 3. Miscellaneous objects may be treated as in Fig. 9.
B. Animal Hair	B. Same as in I A above	B. Same as in I A above	B. Same as in I A above
C. Clothing Fibers, Fabric	C. 1. With care, tweezers or forceps may be used to recover clothing fibers. 2. Same as in I A above	C. 1. Handle as in I A above 2. Care should be taken that the clothing from the victim and that from the suspect(s) is at all times kept and wrapped separately.	C. Same as in I A above
D. Cordage Fibers, Rope	D. 1. Do not handle excessively. 2. Same as in I A above	D. Use tag and wire seal, placing wire about in the middle of the length of rope. See Fig. 8. Where amount of sample is small, place in heavy Kraft envelope and label outer surface. Seal flap. Protect ends of rope sections with glassine envelopes. See Fig. 6, container No. 12.	D. 1. Same as in I A above 2. Wrap rope in heavy Kraft paper as with clothing.

KIND OF EVIDENCE	GENERAL INSTRUCTIONS	LABELING AND PRESERVATION	PACKING FOR SHIPMENT
II. STAINS			
A. Blood - Tissue	A. 1. Where possible remove all or a section of article on which the stain is found and send to Laboratory 2. If above is not practicable, call Laboratory by phone for instructions and assistance. 3. Handle clothing as little as possible. 4. Where wet allow stains to air dry.	A. 1. Use glass containers for flakes and dried stains. Label and seal as in Fig.1. 2. Use glass stoppered bottle or vial for liquid sample. Add small amount of sodium citrate to prevent coagulation. 3. Label clothing as in Fig.8. 4. For miscellaneous objects use glass vials, tags with wire, and lead seals or heavy Kraft envelopes where applicable.	A. 1. Pack glass containers as in "A," Fig. 10. 2. Pack clothing and miscellaneous articles as in Fig.9. Where stain is on material such as wood,linoleum,and wall sections,allow to air dry; protect stained surface with piece of clean white paper before wrapping.
B. Seminal Stains	B. In addition to II A, above, be especially careful in handling clothing or other articles bearing stain as stain is very brittle.	B. 1. Same as in II A above 2. Do not add citrate to liquid samples.	B. Same as in II A,above. Pack miscellaneous articles in cotton, waste,excelsior or paper to prevent movement during shipping. See "A," Fig. 10.
C. Other Body Fluids, Urine, Perspiration	C. In addition to II A above, where material is in liquid state collect with clean syringe to a volume of one pint.	C. 1. Same as in II A above 2. Do not add citrate to liquid samples.	C. Same as in II A above

KIND OF EVIDENCE	GENERAL INSTRUCTIONS	LABELING AND PRESERVATION	PACKING FOR SHIPMENT
D. Feces, Fecal Stains	D. 1. Same as in II A above 2. Where material is in bulk place in jar with firm fitting cover and seal so it is airtight. Determine, if possible, recent diet of person(s) suspected as contributor.	D. 1. Label clothing as in Fig.8. 2. Same as in II A above	D. Same as in II A above
E. Grease - Oil	E. Same as in II A above	E. 1. Same as in II A above--do not use rubber stopper on containers. Seal tightly in preserving evidence in arson investigations. 2. Place liquid samples in container with glass stopper. Do not add citrate.	E. 1. Same as in II A above 2. Seal glass stoppered container so that it is airtight.
F. Paint Stains	F. 1. Same as in II A above 2. When stain is wet, allow to air dry.	F. 1. Same as in II A above 2. Where liquid sample, submit in original container except when volume is large (greater than one pint), then preserve as in A and record all information on paint container label and send to laboratory.	F. Same as in II A above
G. Miscellaneous, Food, Botanical Materials	G. Same as in II A above	G. Same as in II A above	G. Same as in II A above

KIND OF EVIDENCE	GENERAL INSTRUCTIONS	LABELING AND PRESERVATION	PACKING FOR SHIPMENT
III. CLOTHING*			
A. General	A. 1. Do not agitate clothing so that foreign material becomes dislodged. 2. Note particularly any material falling from clothing, when being removed from body of victim or suspect(s).	A. 1. Include description of marks made for identification purposes when submitting clothing. 2. Label as in Fig. 8.	A. Pack as in Fig. 9--pack each item separately and do not allow clothing from different persons to come into contact with one another.
B. Tears, Cuts, and Penetrations	B. 1. Same as in III A above 2. Where gunshot wound is involved submit, if possible, gun used. (See The Wisconsin Sheriff Magazine, Vol. 1, No.9, Oct., 1948, pp.7-12 or Fig.11 of this manual)	B. Same as in III A above	B. Same as in III A above
C. Abrasions, Impressions	C. 1. Where abrasion or impression is present on metal (painted or any other surface) a sharp scaled photograph should be taken and clothing suspected of causing marks sent to Laboratory. (See Fig.22 and Related Text.) 2. Same as in III A above	C. Same as in III A above	C. Same as in III A above

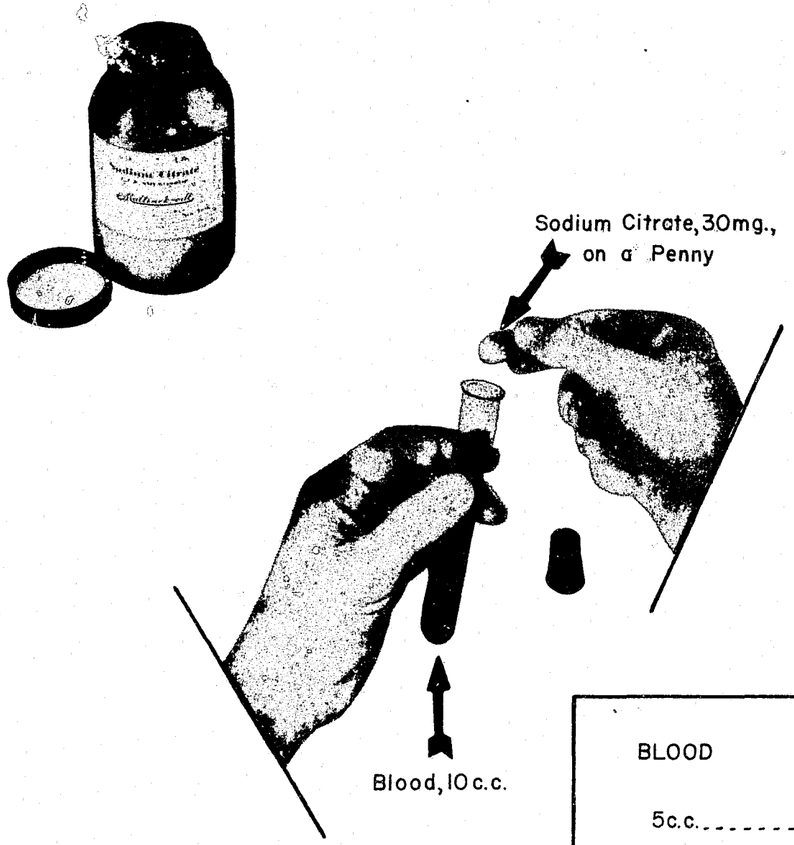
* See also under other headings in table.

KIND OF EVIDENCE	GENERAL INSTRUCTIONS	LABELING AND PRESERVATION	PACKING FOR SHIPMENT
IV. MISCELLANEOUS MATERIALS			
A. Paint Fragments	A. 1. Handle fragments carefully so as not to break off edges. 2. Where clothing is involved, same as in III A above	A. Place in clean glass vials, see Fig. 6, No.6 or 7 (not envelopes), and seal and label as in Fig.6 and 7.	A.1. Pack glass containers as in "A," Fig. 10. 2. Pack clothing as in Fig. 9. Keep articles of clothing separate from possible source of questioned samples (e.g. car,painted wood,etc.)
B. Glass Fragments	B. 1. Do not allow edges to become chipped. 2. Collect all of questioned sample if possible. 3. Do not mark fragments. 4. Same as in III A above	B. Same as in IV A above	B. Same as in IV A above
C. Metal Fragments	C. 1. Same as in IV A above 2. Same as in III A above	C. Same as in IV A above	C. Same as in IV A above
D. Wood Fragments, Wood,Botanical Specimens	D. 1. Where possible,botanical specimens should be submitted in their entirety,but without excessive duplication of integral parts (leaves,seeds,etc.). 2. Same as in IV A above 3. Same as in III A above	D. 1. Same as in IV A above for fragments 2. Botanical specimens such as leaves should be placed in envelopes of appropriate size. See Fig.6, No.11.	D. 1. Pack glass containers as in "A" Fig. 10. 2. Pack envelopes as in Fig. 10.

KIND OF EVIDENCE	GENERAL INSTRUCTIONS	LABELING AND PRESERVATION	PACKING FOR SHIPMENT
E. Material From Fingernails	E. Where fingernail material from victim is recovered, send in clothing of suspect(s). Note if suspect has lacerated skin.	E. Place material from fingers of each hand in separate glass vials or use druggist's fold--seal and label as in Fig. 6, No. 6 or 7.	E. Same as in IV A above
F. Soil	F. Object having mud or soil should be sent to Laboratory without disturbing sample.	F. 1. Same as in IV A above 2. Treat miscellaneous objects as in Fig. 9. 3. Where possible, object should be placed in clean Kraft envelope (e.g., shoes of suspect) and the envelope tightly sealed.	F. 1. Same as in IV A above 2. Pack miscellaneous objects as in Fig. 10.
G. Firewall	G. Handle sample so as to prevent excessive powdering.	G. 1. Place sample in heavy Kraft envelope, seal tightly. 2. Clothing to be handled as in III A, above	G. 1. Pack containers as in Fig. 10. 2. Pack clothing as in Fig. 9, see III A above.

KIND OF EVIDENCE	GENERAL INSTRUCTIONS	LABELING AND PRESERVATION	PACKING FOR SHIPMENT
V. UNIDENTIFIED CHEMICALS			
A. Liquids	A. Keep free of contamination.	A. Submit in original container if possible, and if volume does not exceed one quart. Otherwise place in glass stoppered or screw cap container and seal airtight. See Fig. 6, No. 4.	A. Pack as in Fig. 10.
B. Solids	B. Keep free of contamination.	B. Same as in V A above Quantity not to exceed one pound Seal in airtight glass vial or wide-mouth screw cap jar. See Fig. 6, No. 1, 2, 3, and 5.	B. Pack as in Fig. 10.
VI. AUTOMOBILES	Debris from automobiles should be recovered before persons enter car and disturb interior. See page II-11 of this manual	Place debris collected from floor surfaces in glassine envelopes or wide-mouth jars. Keep debris from front and back seat, right and left sides separate.	Pack as in Fig. 10.

Fig. 5 A SUGGESTED METHOD of PROPER BLOOD PRESERVATION



BLOOD	SODIUM CITRATE
5c.c.	15mg
10c.c.	30mg
15c.c.	45mg

(Note: A Penny May Be Used As A Spatula)

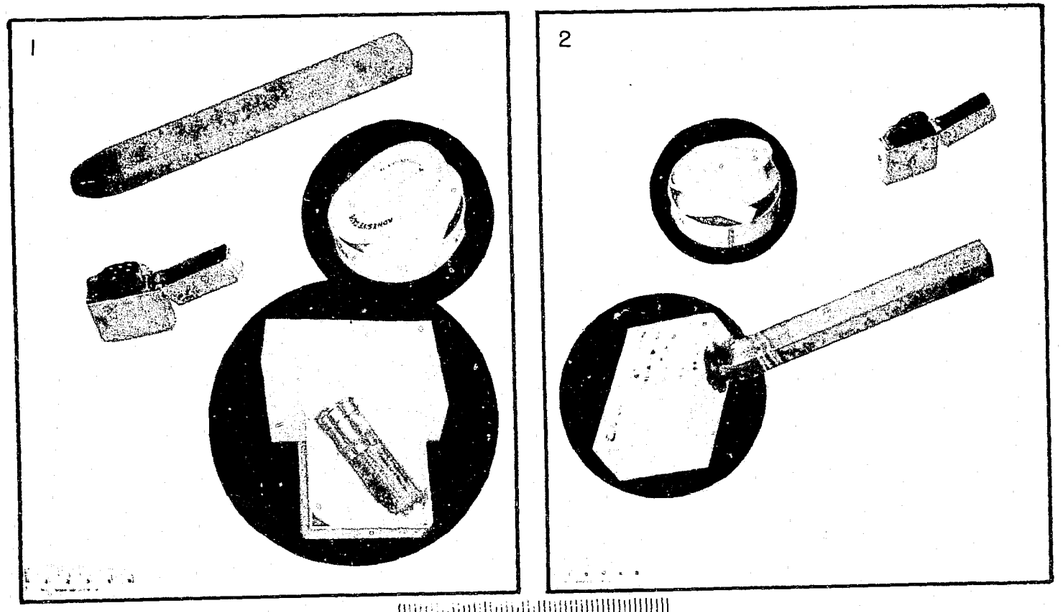
Source: Wisconsin State Crime Laboratory

Fig. 6 EVIDENCE CONTAINERS and SEALING METHODS

Source: Wisconsin State Crime Laboratory

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

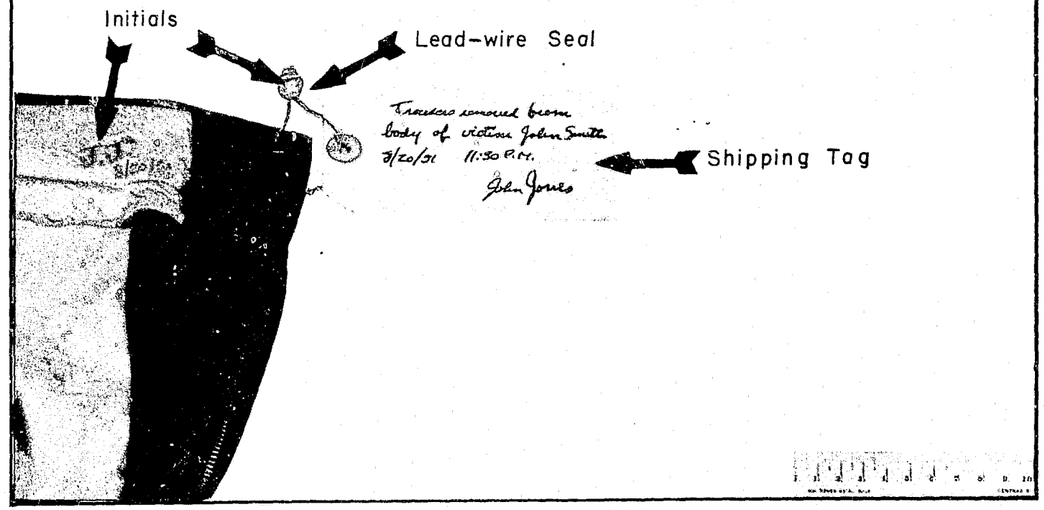
Fig. 7 PROPER SEALING of CONTAINERS

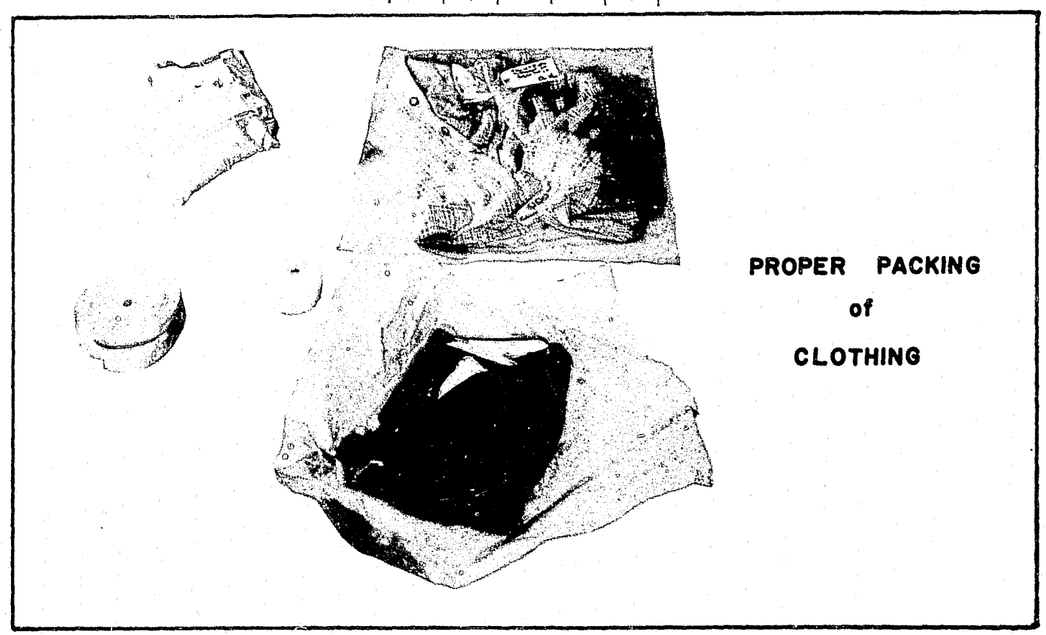


Source: Wisconsin State Crime Laboratory

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Fig. 8 PROPER LABELING of CLOTHING

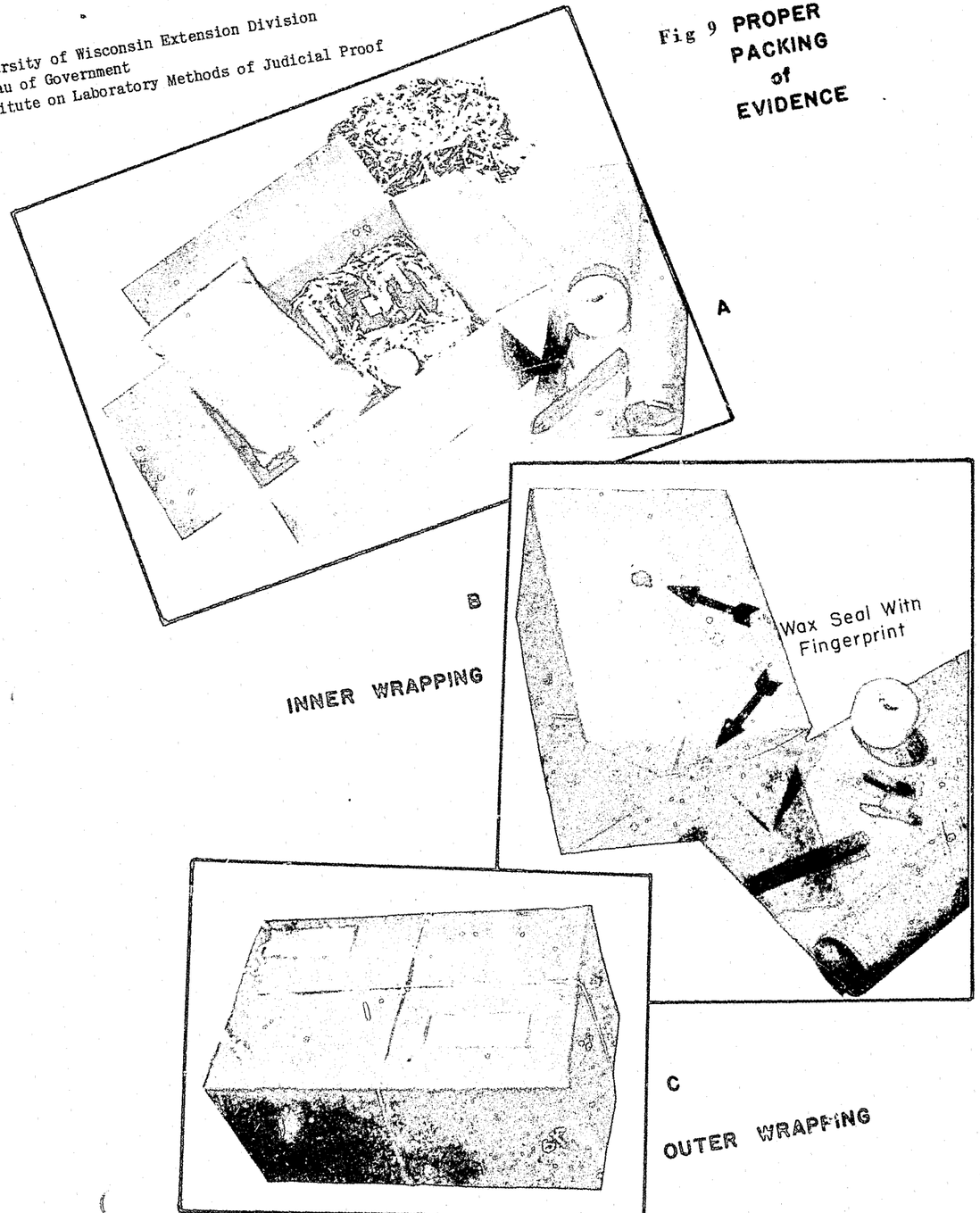




Source: Wisconsin State Crime Laboratory

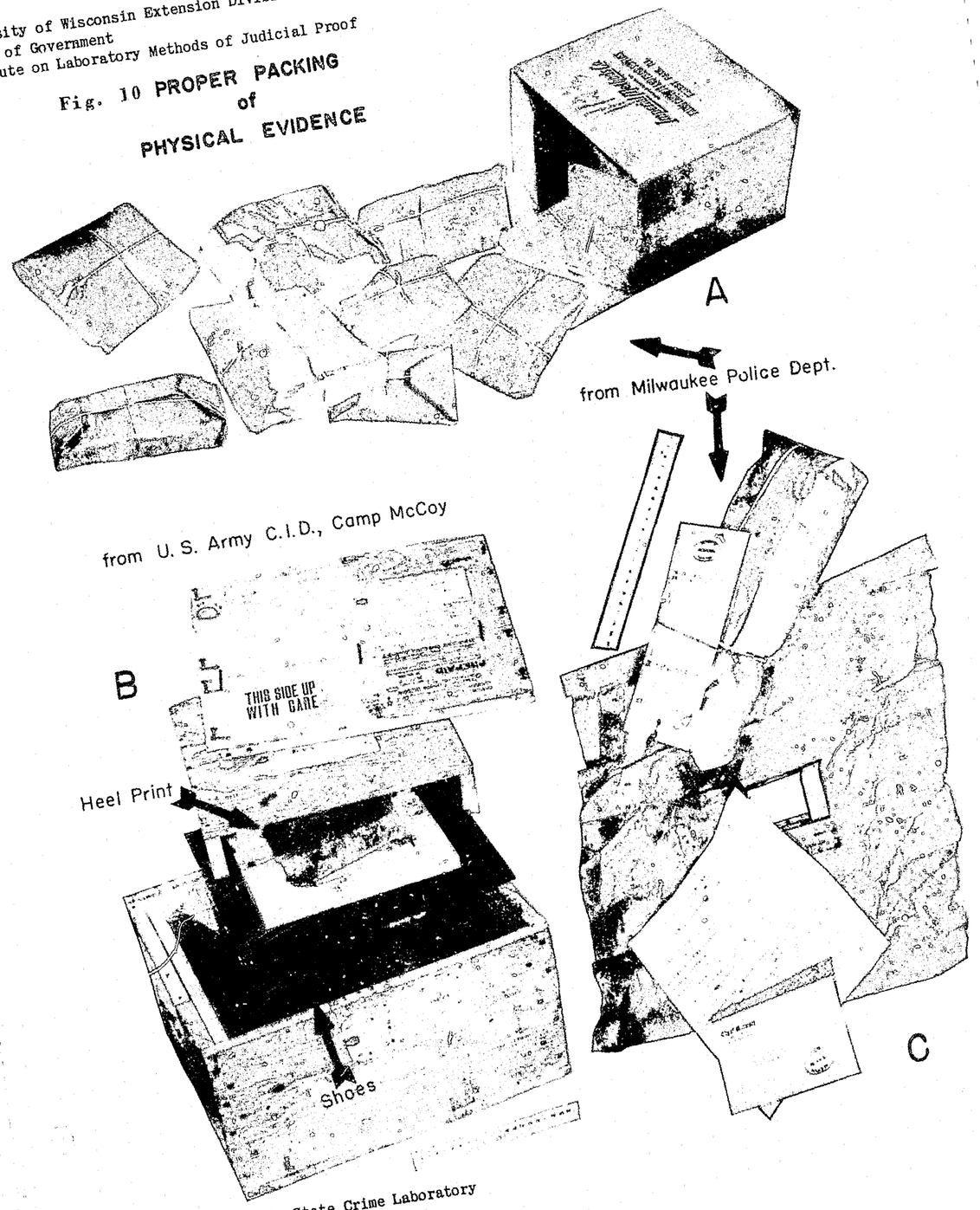
University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Fig 9 PROPER PACKING of EVIDENCE



University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Fig. 10 PROPER PACKING of PHYSICAL EVIDENCE



Source: Wisconsin State Crime Laboratory

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Instructions for Handling, Marking, and Shipping Firearms Evidence

Firearms require somewhat different treatment than the other types of evidence hitherto discussed in this section. A summary of the essential information on firearms that every line officer should be familiar with is given in Figs. 11, 12, and 13, which follow this page. Figure 11 deals with the marking, handling, and shipping of firearms evidence to the Laboratory. Figures 12 and 13 diagram, for purposes of identification, the types of exhibits frequently encountered in the investigation of cases that involve the use of firearms.

These figures are available for posting on bulletin boards. Write to the Wisconsin Sheriffs Association.

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Fig. 11

INSTRUCTIONS FOR HANDLING, MARKING, AND SHIPPING FIREARMS EVIDENCE

EXHIBIT	GENERAL INSTRUCTIONS	DESCRIPTIVE RECORD TO BE KEPT BY PERSON RECOVERING (NOTE 1)	RECOMMENDED METHOD OF MARKING FOR IDENTIFICATION	INSTRUCTIONS FOR PACKING FOR SHIPMENT TO LABORATORY
A FIREARMS	Check for finger prints. Remove magazine from autoloading weapons. Do not clean or fire. Do not operate mechanism except to unload. If loaded or fired shells in revolver, mark positions. See diagram.	A record of make, model, type, caliber or gauge designation, serial and lot numbers should be retained by person and agency recovering.	Scratch initials or marks of identification on side of frame, receiver, backstrap, barrel, etc. Do not use "X." Do not mark stocks, side plates or part that can be readily removed or replaced.	Place in heavy paper envelope. Forward to laboratory. See Note 4.
B FIRED BULLETS	Every precaution should be taken to prevent abrading or mutilating rifling surface in any way. Do not wash or clean.	Assumed caliber. Notes as to marks of identification. Description of any distinctive features.	Scratch initial on ogive near nose of bullet. Do not use "X." Note 2. If more than one bullet recovered, use initial of person recovering and designate the several bullets by A, B, etc., keeping notes as to source of each.	Wrap in clean cotton or rags. Place in cardboard pill box or rigid container. Do not put in envelope. Mark on container source of each bullet. Forward to laboratory. See Note 5.
C FIRED METALLIC CARTRIDGE CASES	Do not mar, mutilate, scratch or nick head of shell. If recovered in revolver cylinder, mark chambers to correspond with shell designation. See diagram, also note 3.	Notes as to mark of identification used. Head designation of maker. Sketch showing relative position of shells if recovered on floor, street, etc. Transmit this information to laboratory Note 3.	Scratch one initial or mark of identification near mouth of shell, preferably inside of mouth. Do not scratch, nick, mar or mutilate head or rear portion of cartridge case.	Roll individually in paper. Place rubber band around paper. Place wrapped cartridges in heavy paper envelope. Forward to laboratory See Note 5.
D FIRED PAPER SHOT SHELLS	Do not mar, mutilate, scratch or nick head of shell.	Notes as to mark of identification used. Sketch showing relative position of shells when recovered, if shells recovered on floor, street, etc. Transmit this information to laboratory. Note 3.	With ink or indelible pencil mark inside of mouth of shells using initials of person recovering. Do not scratch, nick, mar or mutilate brass head of shell.	Roll individually in paper. Place rubber band around paper. Place wrapped cartridges in heavy paper envelope. Forward to laboratory. See Note 5.
E SHOT PELLETS	Recover as many as possible. Do not mutilate in removal.	Source and position of recovered pellets. Record of number sent to laboratory. Notes on marks of identification used on seal.	Seal container, marking seal with mark of identification on gummed label seal or on envelope.	Use pill box as shipping container. Place box in envelope, sealing envelope. Indicate source of pellets on envelope. Forward to laboratory See Note 5.
F SHOT WADS	Recover as many as possible.	Source of wads recovered. Transmit this information to laboratory. Notes on marks of identification used.	Using ink or indelible pencil inscribe initials of person recovering as mark of identification. Do not use "X." Place in envelope, sealing for transmission to laboratory	Place in paper envelope indicating source on envelope. Forward to laboratory. See Note 5.
G LOADED SHELLS OR CARTRIDGES	If loaded ammunition or fired cartridge cases are recovered in investigation, forward to laboratory. If ammunition maker's boxes recovered, forward to laboratory, marking box for identification.	Source or where found. Head designation of maker. Notes on marks of identification used.	Brass cartridges—Scratch mark on side of case near mouth. Paper shot shells—Use ink or indelible pencil. Mark side of shell. Do not mar, mutilate or nick head of shell.	Roll individually in paper. Place rubber band around paper. Place wrapped cartridge in heavy paper envelope. Forward to laboratory See Note 4.
H SHOT OR POWDER PATTERNS	If on clothing—send only clothing to laboratory that contains powder, powder residues or bullet or shot penetrations. If on skin, doors, walls, etc., consult laboratory concerning scaled photographs.	Description of garment containing shot or powder patterns. Location of shot or powder patterns if on walls, doors or other immovable objects.	Clothing—Attach tag to each article of clothing, indicating source. Mark lining with ink or indelible pencil. Use initials of person recovering.	Wrap clothing in clean paper. Forward to laboratory. See Note 5.

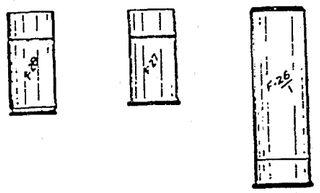
1. Notes should be made covering source, date, place, time and relative position of exhibit at time recovered. Particular method employed in marking for future purposes of identification.
2. Since examination of base of fired bullet may disclose type of propellant used in firing, care should be exercised so as not to disturb powder residues on base.
3. Make sketch of area where shells recovered, indicating relative positions in feet and inches from fixed object.
4. Postal regulations prohibit shipment of explosive substances of firearms through the mails. Ship via express only.
5. After wrapping as suggested, exhibits may be forwarded to the laboratory via messenger, registered mail, or express. Ship in rigid container. Before submitting to laboratory obtain clearance from the District Attorney and superior officer.

SHIPPING INSTRUCTIONS

Before sending these exhibits to the laboratory, clearance should be obtained through the District Attorney's Office and through your superior officer.

Fig. 12
MARKING FIREARMS EVIDENCE FOR PURPOSES OF IDENTIFICATION

In Marking—Use Needle or Sharp Point of a Knife
Do not use "X" as mark of identification
Use one or two initials of Officer recovering as mark of identification.



LOADED CARTRIDGES—
FIRED CARTRIDGE CASES

MARK—INITIAL OF OFFICER Recovering—
On **Side** of Cartridge Case near Mouth.

DO NOT — Mar or mutilate Rim, Head or Primer Cup of Fired Cartridge Cases.

PAPER SHOT SHELLS loaded or fired, use either ink or indelible pencil, inscribing initials of Officer recovering on paper tube.

FIRED BULLETS

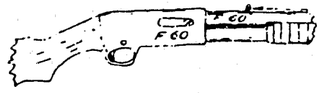
MARK—INITIAL OF OFFICER Recovering—
In Area indicated — Wrap Individually in Paper.

DO NOT — Mar or Mutilate Base, sides or Cylindrical Portion Containing Rifling Marks.

HAND ARMS—REVOLVERS, AUTOMATIC PISTOLS, SINGLE SHOT PISTOLS

MARK—INITIAL OF OFFICER Recovering—
On Barrel, Frame or Receiver as Indicated.

DO NOT MARK Removable Parts or Stocks.



RIFLES, SHOTGUNS, MACHINE GUNS

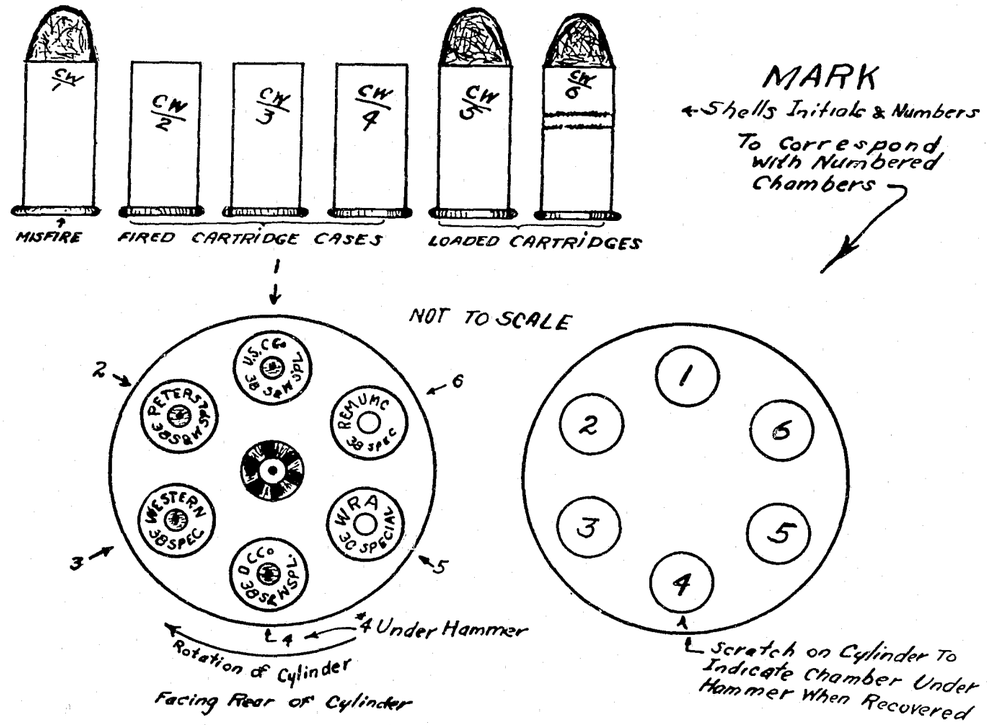
MARK—INITIAL OF OFFICER Recovering—
On Barrel, Frame or Butt as Indicated.

DO NOT MARK Removable Parts or Stocks.

Source: Wisconsin State Crime Laboratory

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Fig. 13 MARKING FIRED CARTRIDGE CASES OR MISFIRED AMMUNITION RECOVERED IN REVOLVERS



Mark of Identification	Chamber Position	Condition	Maker
CW/1	#1	Misfire	U. S. Cartridge Co.
CW/2	#2	Fired	Peters Cartridge Co.
CW/3	#3	Fired	Western Cartridge Co.
CW/4	#4	Fired	Dominion Cartridge Co.
CW/5	#5	Loaded	Winchester Repeating Arms Co.
CW/6	#6	Loaded	Remington Arms Co.

This information should be preserved since it is possible for the Laboratory to determine the caliber, make and type of propellant or powder used from either a fired bullet or a fired cartridge case. The relative positions of fired cartridge cases in the weapon as recovered then becomes important.

Source: Wisconsin State Crime Laboratory

THE PATHOLOGIST AND TOXICOLOGIST IN CRIMINAL INVESTIGATIONS

A pathologist is a highly specialized physician who is trained to examine the fluids and tissues of the body, both chemically and microscopically, and to aid in the diagnosis of disease. He is also trained to perform autopsies in order to determine the exact cause of death and to correlate the post-mortem findings with clinical observations made during life. In his daily work he is continuously concerned with solving the riddles of disease through careful observation. This type of training makes him admirably suited for medicolegal work. Although such training enables the pathologist to be of great help in the solution of criminal cases, it should be realized that additional training in medicolegal work is highly desirable before the pathologist can render the greatest service. Most medical authorities familiar with the problem strongly emphasize that a physician without this training generally should not perform an autopsy.

When it must be determined whether or not an autopsy is necessary, remember that it is more advisable to err on the side of over- rather than under-examination. It is just as important to disprove as it is to prove the possible causes of death.

Ordering the Autopsy

Once an autopsy has been decided upon, it should be performed as soon as possible. Although under Wisconsin statutes either the district attorney or the coroner may order an autopsy in suspicious cases, it is always well to obtain consent of the next of kin or, if that is not possible, that of the person who assumes responsibility for the body. It is not difficult to obtain such permission, because it indicates that everything possible is being done to ascertain the facts in the case. It is also additional protection to the district attorney, the coroner, and the physician.

The body must not be embalmed prior to the autopsy because it prevents both a satisfactory examination and toxicological study. The pathologist should be informed of the essential facts of the case prior to the autopsy in order to facilitate his examination and to suggest any special procedures or examinations which might be desirable at the time of the autopsy. In every instance the autopsy should be complete. It should include the head, neck, chest, abdomen, and pelvis. Frequently, information of great value is found where it is least expected.

Because the examination by the pathologist, although of great importance, is only a part of the picture, it is appropriate to indicate briefly in a very general manner what kind of information one can expect to gain from his examination and what information the investigator can obtain to help him. The pathologist can frequently give some estimate as to the time when death occurred. For this

reason it is important that the temperature of the dead body be noted by the investigator. It is sufficient to lay the hand upon protected surfaces of the body, such as under the arms. If warmth is noted, it is evidence that death has taken place within a few hours. If the body is cold at average room temperature, death probably occured 18 to 24 hours previously.

It is also important to notice whether there is a purplish discoloration (post-mortem lividity) of the body and where it is localized. Also note whether rigor mortis, or stiffening of the muscles, is present. By combining the observations on temperature, post-mortem lividity, and rigor mortis, the pathologist estimates the time of death. He can also obtain additional evidence on this point by the presence or absence of food in the stomach and small intestine.

Occasionally the pathologist can give a final answer immediately upon completion of the autopsy. However, it is usually necessary to study the tissues microscopically and to incorporate and evaluate the toxicological report in the final summary of his findings regarding the case.

The district attorney and the coroner should have a copy of the completed report and, if necessary, discuss the case with the pathologist so that there may be no misunderstanding between them concerning the interpretation of the pathologist's findings and his reasons. On rare occasions the pathologist will be unable to give any specific cause or indication of the cause of death. This should not be construed as due to lack of ability but rather as an expression of his honesty.

The Importance of Identification

Identification is of the utmost importance. The pathologist must know on which body he is working. Identification can be provided by the clothing, identity cards, etc., all of which should be turned over to the police or crime detection agency. In the case of unidentified bodies, photographs, fingerprints, characteristics of the teeth, tattoo marks, incision scars, evidence of fractures, birthmarks, or tumors may all be of help. (See following section dealing with Missing Persons.)

It is well to have one or two witnesses at the autopsy, but no one should be present unless immediately concerned with the case. The pathologist should record all observations completely so that nothing will be omitted. The original stenographic or longhand notes should be kept as a part of the records. His record should be augmented by photographs wherever necessary.

In firearms cases the victim's clothing and any bullets should be obtained and treated as described in this manual. In cases of suspected poisoning it is essential to search thoroughly for the possible agent. It is much simpler for the pathologist and toxicologist to make a proper examination for the poison if it is known what

possible types of agents were used. Otherwise the process is more complex.

The above facts merely indicate how much the pathologist can contribute. There are probably very few instances in which he cannot be of some assistance. Examinations by him are essential in the following conditions although they will not be described in detail: Asphyxial deaths such as drowning and hanging; cases of abortion and infanticide; cases of rape. Identification of race, age, sex, and stature can usually be obtained if parts of the skeleton are available for examination. Similar observations are of the utmost importance in the identification of burned bodies and also when there has been putrefacation or mutilation of the body.

Instructions for the Submission of Material for Toxicological Analysis*

When material is submitted for chemical analysis it is important to follow the directions indicated in the paragraphs below.

"It is of particular importance in cases involving suspected poisoning that considerable attention be given to the matter of the correct choice of material and its collection and preservation before analysis. The opportunity to make this choice under the best conditions comes only once; it should then be done with a view to all of the requirements that might subsequently arise. The material should be properly chosen, it should be abundant, and it should be preserved as nearly as possible in its original condition. No artificial preservatives should be added under any circumstances. It is sufficient to seal the material in jars and keep it cold.

"The best sources of material are those organs of the body through which the poison is ingested, transported, eliminated, or stored. The entire stomach and contents should always be taken. Next in importance is the blood, then the liver. In the case of poisons which affect the nervous system, the brain is a good source of material. The kidneys and spleen, although small, serve as receptors for poisons in general. Metallic poisons have a tendency to accumulate in the bone, in the horny material, such as the skin, and, in the case of arsenic, in the hair and nails. Finally, the contents of the intestinal tract, the urine and the feces will frequently contain large portions of the poison in those cases where death has been delayed.

*Dr. Joseph T. Walker of the Massachusetts Department of Public Safety has prepared an excellent outline of instructions for the submission of material to the laboratory for analysis. This discussion was originally published, pages 263-267 (6th Ed.), Homicide Investigation by LeMoyne Snyder and is reproduced here with the permission of Charles C. Thomas, the publisher, and Dr. Walker. Some minor changes have been made.

"ALCOHOL.--Alcohol is generally determined in the blood, the brain, the spinal fluid, and, in some cases the urine or the stomach contents. Any one of the first three materials is sufficient in most cases. The blood is the most readily accessible of the three and is very satisfactory. Analysis of the stomach contents, coupled with the analysis of the blood and the urine, may give some information as to the recency with which the alcohol was taken. Alcohol is very volatile, and consequently material destined for analysis should be placed in containers as soon as possible, sealed with an airtight seal, and refrigerated. Exposed at room temperature, the material may lose its alcohol content very rapidly. Two ounces of blood should be submitted. The container, regardless of its size, should be completely filled with blood. One half of the brain should be placed in a quart mason jar, tightly sealed and refrigerated. Putrid blood is unsuitable for an alcohol determination.

"CARBON MONOXIDE.--Carbon monoxide blood has very little tendency to clot. The cells will therefore tend to separate from the plasma in the blood vessels and organs of the body. Since the carbon monoxide is contained in the cells, and not in the plasma, considerable care should be taken in removing the sample of blood to stir the corpuscles thoroughly in order to get a representative distribution of carbon monoxide. If the blood is taken from the heart, this may be done by filling the syringe and flushing it back into the heart, then refilling to take the sample. Two ounces of blood should be submitted for this analysis. A small bottle or vial should be completely filled, sealed, and refrigerated until delivery to the laboratory. Although carbon monoxide is volatile, in many instances it may be recovered from the blood of putrified bodies or those recovered from fires.

"CYANIDE.--The organs should be placed in clean pint or quart mason jars, sealed tightly, and refrigerated until delivered for analysis. Cyanide is volatile. If any drinking glasses, jars or bottles, suspected to contain cyanide, are found on the premises, they should be submitted for analysis immediately. If the contents are exposed to the air, they should be protected. Either the contents should be removed, placed in a bottle, and tightly corked and sealed, or the original container should be sealed...(See Fig. 6.)

"Accompanying the material submitted for analysis should be the following information:

"1. Case referral sheet completely filled out.

"2. The name, address, age, and occupation of the deceased. Also date and time of death.

"3. A detailed account of the medical history and medical treatment prior to death.

"4. A description of the post-mortem findings and a copy of protocol. Also name of pathologist.

"5. A list of poisons that are to be searched for.

"6. Additional information that may be relevant to the case and a summary of facts in information as complete as possible."

An Outline for the Selection of Material for Toxicological Analysis

All containers should be properly marked and sealed as illustrated in Figures 6 and 7.

Feces:	In separate jar
Vomitus:	Entire in jar
Stomach:	Entire stomach and contents in pint jar
Intestine:	Contents only in pint jar
Urine:	Contents of bladder in pint jar
Liver:	In quart jar (at least two pounds)
Kidneys:	Both kidneys in pint jar
Heart:	In pint jar
Brain:	In quart jar
Blood:	Pint or quart jar
Bone:	Two ribs or portions of exposed section of spinal column
Hair:	Considerable quantity from back of head as close to scalp as possible--also toe nails
Lungs:	Both in quart jar

Anatomical Outlines and Dental Chart

The following illustrations, Figs. 14 to 19 inclusive, are anatomical outlines included for the use of the district attorney in cases involving serious bodily injury or death, such as stabbing cases, gunshot wound cases, etc. The outlines may be made availabl to either the attending surgeon, the pathologist, or autopsy surgeon so that he may accurately locate and identify injuries or wounds, powder burns, the path of penetrating bullets, exit wounds, bruises, and lacerations. After such information has been recorded on this set of anatomical outlines or charts, these marked outlines, if forwarded to the Laboratory, will be photostated for the Laboratory files and the original marked outline returned to the district attorney for use at the time of any subsequent criminal trial. If these marked charts are received by the Laboratory from a district attorney, unmarked replacement charts will be mailed to the district attorney to replace the copies contained in this manual.

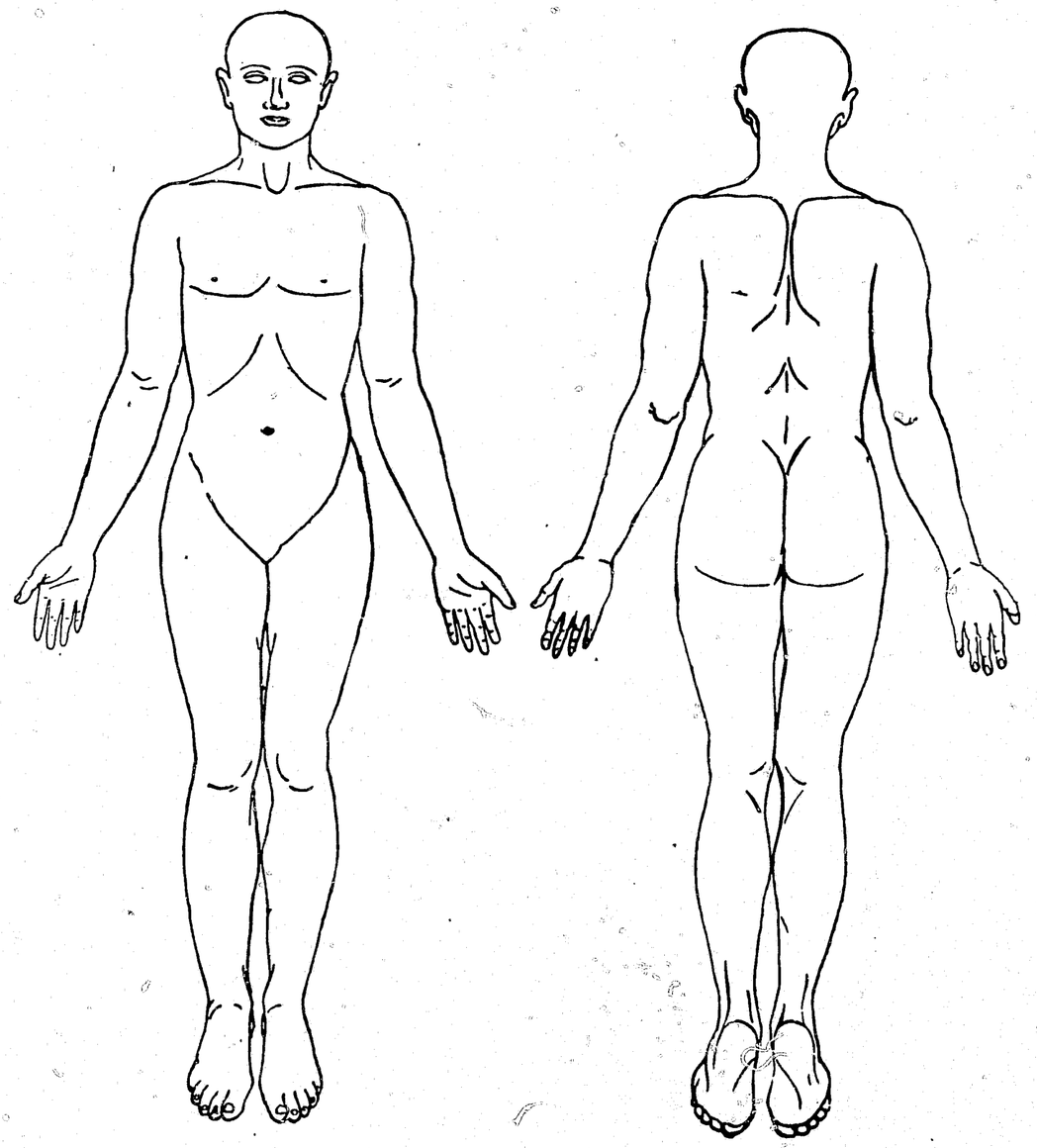
These anatomical outlines, and particularly the dental chart, will be useful when used with the missing persons data sheet which appears in the following section.

CONTINUED

1 OF 3

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof (FRONT, REAR)

Fig. 14 ANATOMICAL OUTLINE - (FRONT, REAR)



Source: Wisconsin State Crime Laboratory

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

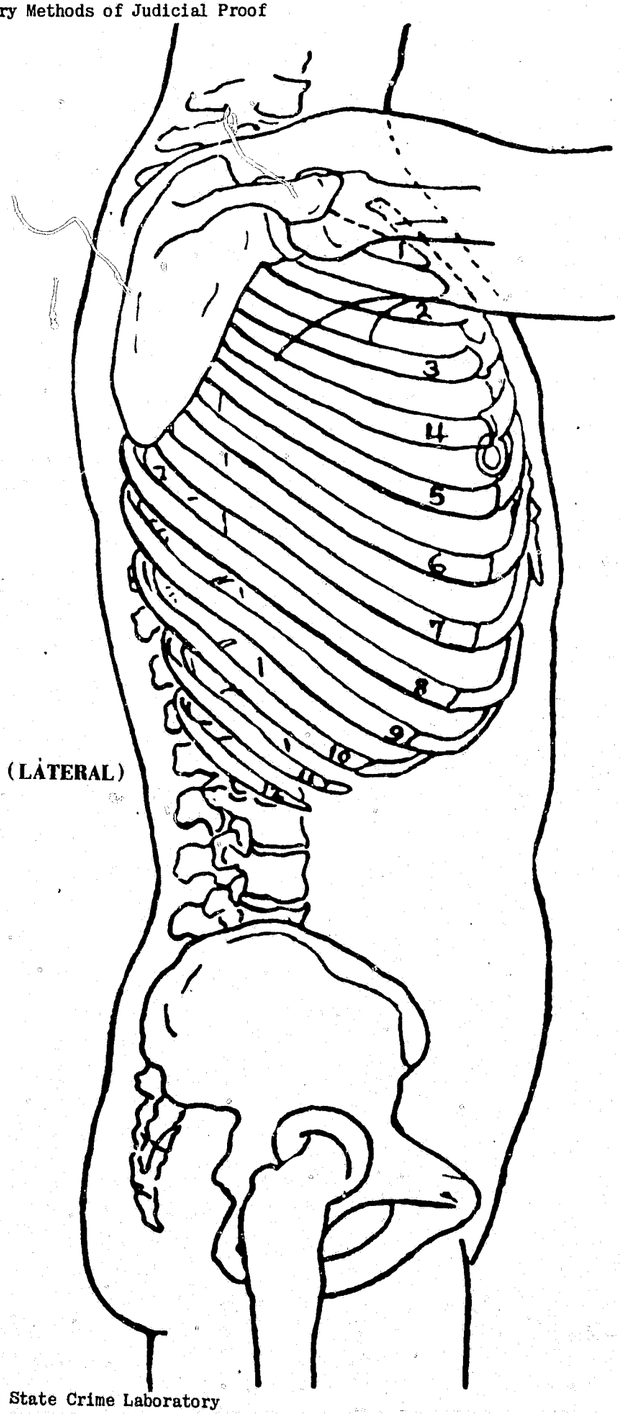
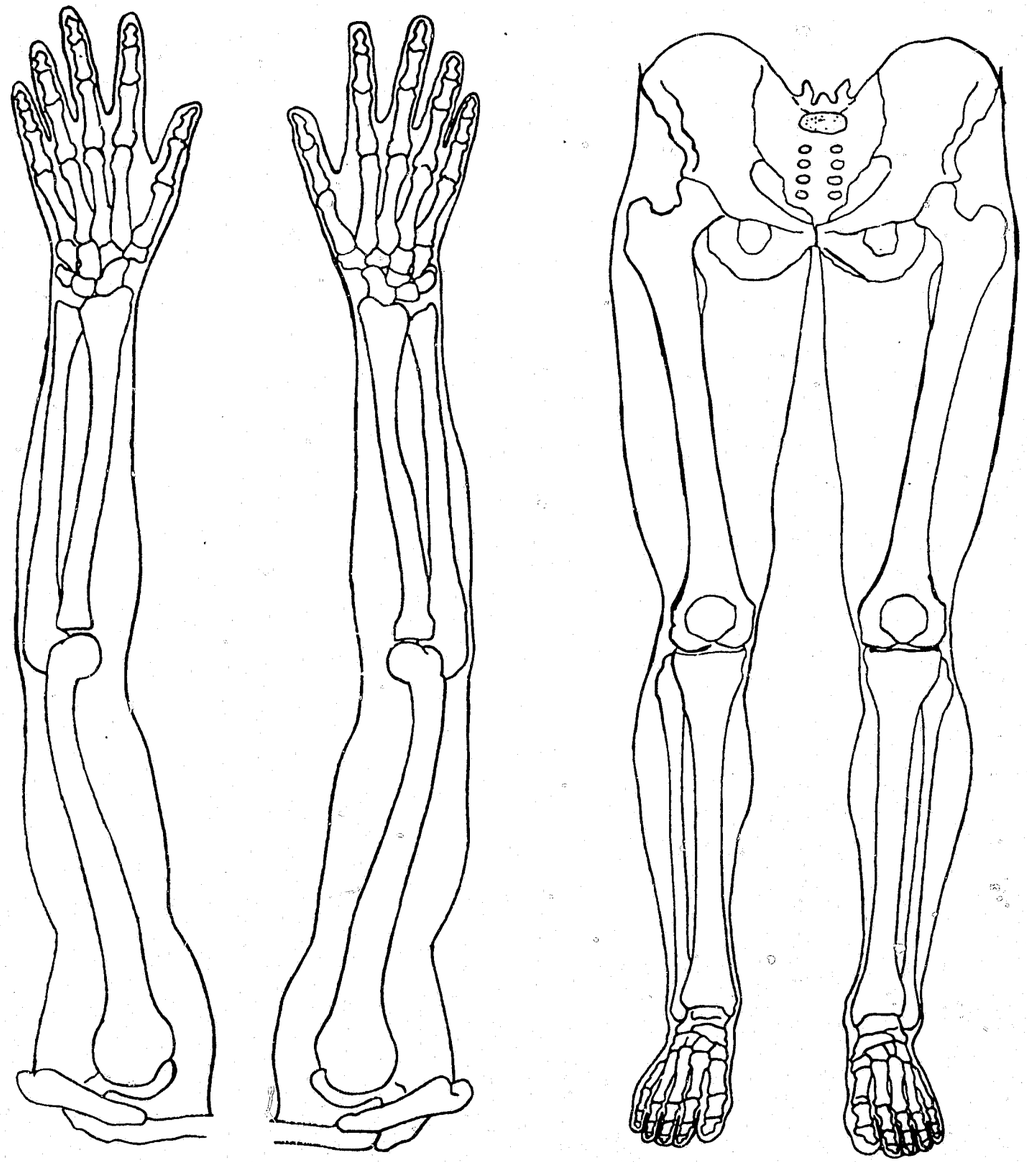


Fig. 15
ANATOMICAL OUTLINE - (LATERAL)

Source: Wisconsin State Crime Laboratory

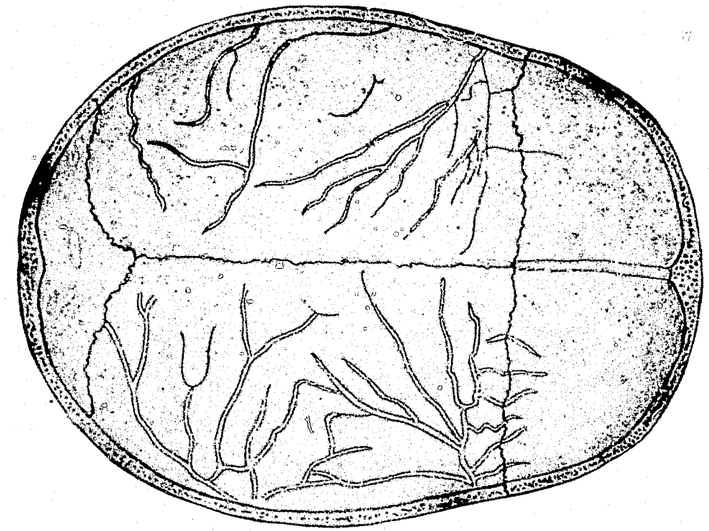
Fig. 16 ANATOMICAL OUTLINE - ARMS AND LEGS

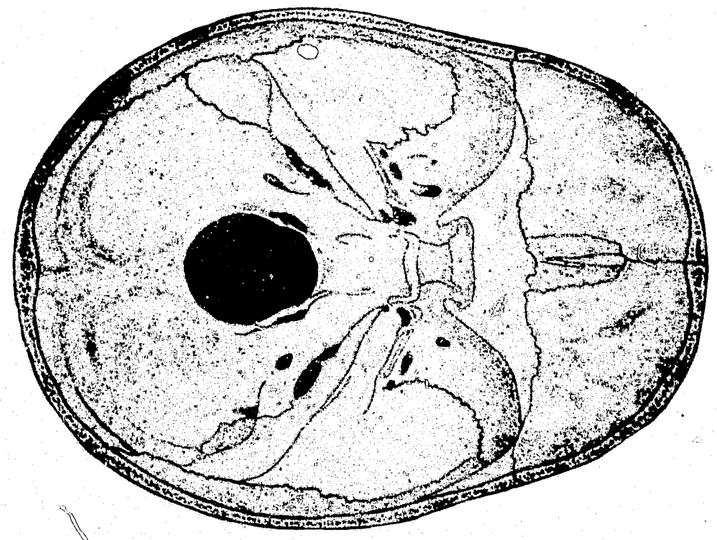


University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Source: Wisconsin State Crime Laboratory

Fig. 17 ANATOMICAL OUTLINE - SECTION SKULL

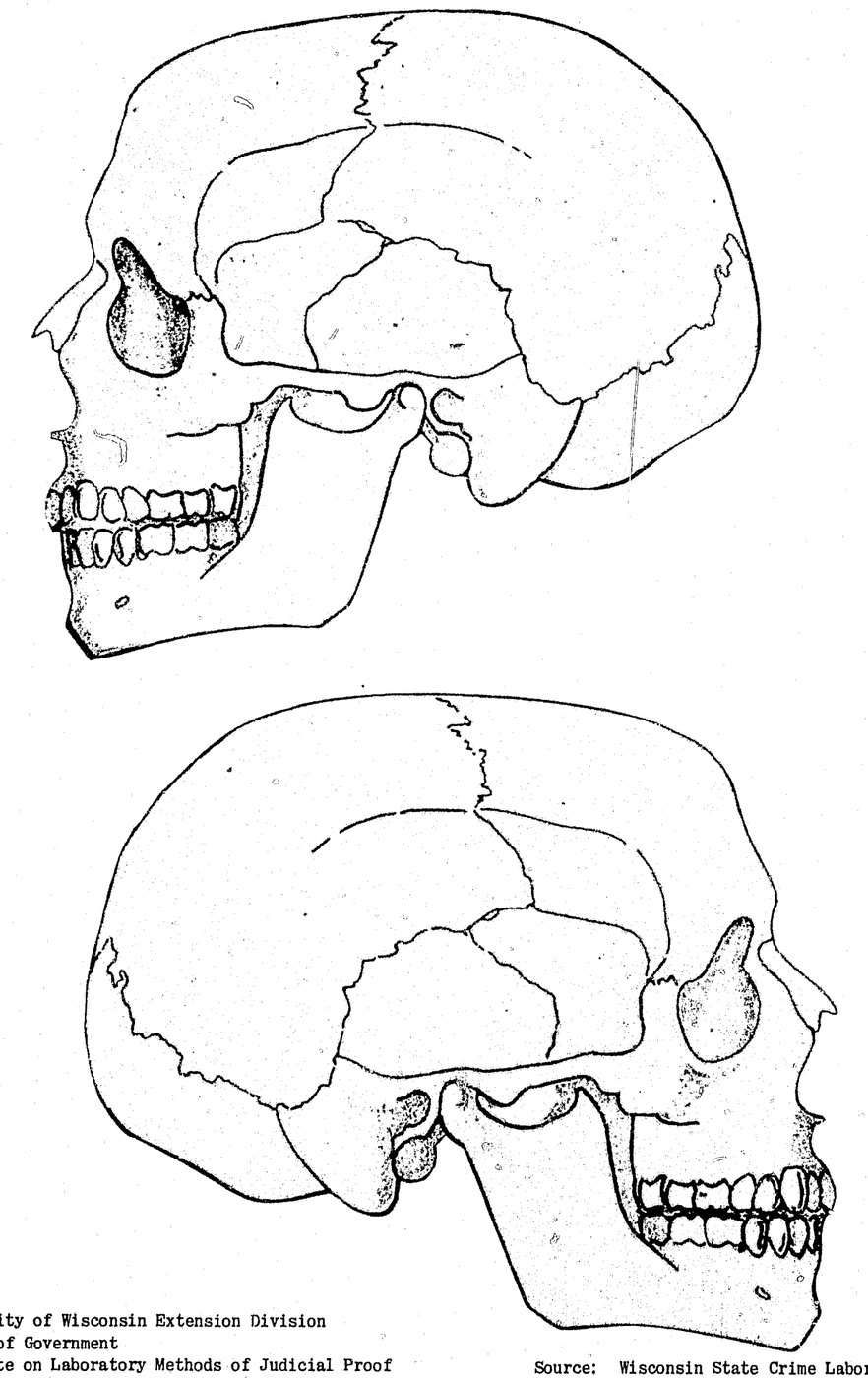




University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Source: Wisconsin State Crime Laboratory

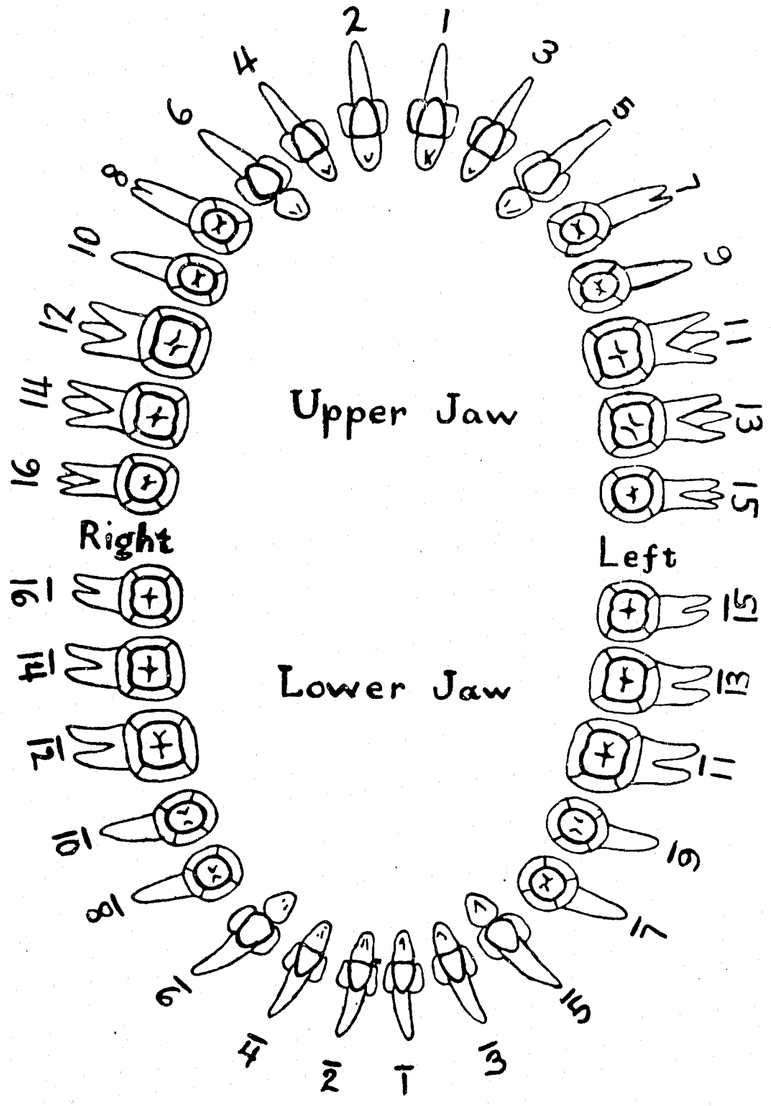
Fig. 18 ANATOMICAL OUTLINE - LATERAL SKULL & JAW - LEFT & RIGHT



University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Source: Wisconsin State Crime Laboratory

Fig. 19 DENTAL CHART-TEETH



University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Source: Wisconsin State Crime Laboratory

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

DATA REQUIRED IN MISSING PERSONS CASES

The following Missing Persons Data Sheet, a questionnaire, was prepared after a survey of similar forms used by police departments, district attorneys and other investigatory agencies. It reflects the regular operating experiences of these agencies as well as their experiences in disaster situations.

This sheet, although lengthy, contains in substance a suggested outline of the detailed facts and particulars which should be sought by an enforcement agency at the outset of a missing persons investigation.

Obviously all of the information sought cannot be obtained, but when a bona fide missing persons investigation is commenced, it is suggested that every available effort should be made to complete as far as possible the included data sheet. This should be forwarded to the Laboratory, where it will be permanently retained, the information digested, cross-indexed, and constantly checked against descriptions of skeletal remains, found bodies encountered, not only by this Laboratory, but by other enforcement agencies reporting such information (through enforcement bulletins, correspondence, etc.)

Procedure In Reporting Missing Persons. In cases involving juveniles reported missing, it is suggested that a waiting period of approximately two weeks elapse between the actual disappearance of a juvenile and the filing of such a missing persons report with this Laboratory. This suggestion should be disregarded if there is any real reason to believe that the juvenile may be the victim of foul play. Under these conditions the missing persons report should be immediately filled out and forwarded to this Laboratory.

It is suggested that this waiting period be observed, since experience has shown that there are many cases of runaway juveniles reported to police departments and sheriffs' offices in which after a matter of several days the juvenile is located or returns home.

The Laboratory proposes that, upon the receipt of a bona fide report of a missing person and the submission of the included data sheet, these will be photostated and copies will be supplied both to the submitting agency and to the district attorney of the county in which that submitting agency is located, the original data sheet being permanently retained in Laboratory files. As has been indicated, until the person is found or a positive identification is made, thus dispelling any question as to the whereabouts of a missing person, these Missing Person Data Sheets will be filed in this Laboratory so that detailed information will be instantly available concerning any missing person who may be listed in our file.

University of Wisconsin Extension Division
Bureau of Government
Institute on Scientific Methods of Judicial Proof

MISSING PERSONS DATA SHEET

ATTACH PHOTOGRAPH OF MISSING PERSON. Every photograph submitted should include the date it was taken.

1. Name: _____ (include nickname or other names known by: _____).
2. Sex: Male ( ) Female ( )
3. Race: White ( ) Yellow ( ) Brown ( ) Black ( ) Other _____
4. Extraction or descent: (e.g., German, Swedish, Indian, etc.) _____.
5. Date of birth: _____ (approximate age if date not known). Where born _____.
6. Height: _____ ft. _____ in. 7. Weight: _____ lbs.
8. Hair: a. color? _____; b. bald? _____, partly or completely? _____ _____; c. bushy or thin? _____; d. mustache (when last seen)? _____; e. beard (when last seen)? _____; f. Is hair naturally curly? _____; g. Does subject use hair dye? _____, If so, what color? _____, what brand? _____.
9. Eyes, color? _____.
10. Did subject wear glasses? _____; a. wearing them when last seen? _____; b. If so, is prescription available? _____; c. Give name and address of oculist who prescribed and filled prescription _____ _____; d. Give make, style, and type of spectacle frame, if known _____; e. Are glasses missing? _____.
11. Marital status: Single ( ) Married ( ) Separated ( ) Divorced ( ) Widow ( ) Widower ( )
12. Did subject carry religious or fraternal insignia (medals)? _____, describe _____; a. Subject attended church regularly ( ), occasionally ( ), never ( ); b. What church? _____.
13. Education (where, when, and extent of) _____ _____.
14. Ever arrested? (when, where, and why) _____.
15. Fingerprint classification: _____; a. Is fingerprint card available? _____ b. If so, where? _____.
16. State of health when last seen _____. Was subject under treatment of a physician, psychiatrist or other doctor? _____; If so, give name and address of doctor _____.
    a. Deformities (describe body deformities if present, amputations, missing eyes, deaf, limps, hunchback, deformed arms or legs) _____.
    b. Marks and scars (tattoos, operation and accidental scars, moles) _____.
    c. Speech defects (lisps, stutters, stammers, etc.) _____.

MISSING PERSONS DATA SHEET (Cont'd)

16. (Cont'd)
d. Speech characteristics: 1. Profane or vulgar, often ( ), occasionally ( ), never ( ). 2. Does subject have any pet sayings? _____; If so, what? _____. 3. Does subject have accent, speak "broken" English or foreign language? Explain: _____.
e. Did subject ever have any bones broken? _____; If so, which bones were broken? _____ When were they broken? _____
f. Did subject ever have any x-rays taken? _____; when, where, for whom, and of what part of body? _____
g. Did subject ever have a serious ailment or surgery? _____; If so, give name and address of attending physician _____.
h. Give subject's blood type, if known _____.
i. Teeth (condition of teeth): List all extractions or missing teeth _____. 1. Did subject wear teeth braces or plate? _____; If so, type of plate (upper, lower, partial) _____. 2. Give name and address of treating dentist _____.
j. Does subject wear truss, supports, or braces? _____; If so, describe _____.

17. Social Security No. _____. Did subject ever apply for Federal employment? _____; Where, when, what type of work? _____. Did subject ever work on defense project or industry? _____; When, where, and what project? _____.

18. Did subject serve in U. S. Armed Forces? _____ a. If so, what service (army, navy, etc.)? _____. Give service or serial number _____. Rank or rating? _____.

19. Did subject wear jewelry (describe in detail, giving engravings, serial numbers, and other identifying marks)?
a. Rings? _____; If so, which hand and finger? _____
b. Watch? _____; If so, serial number and case number? _____ Was it a wrist watch or pocket watch? _____
c. Other types of jewelry: _____.

20. Occupation: _____ a. Where was subject employed? _____. Did he carry a Union card? Member? _____ Give subject's card number _____. Does subject hold operating license for his occupation(s)? (electrician, plumber, chauffeur, etc.) _____; If so, give type of license and identifying number _____; b. Other skills or trades _____. c. What does subject do for recreation, pastime, hobbies? _____.

21. Habits:
a. Uses tobacco to excess ( ), moderately ( ), never ( ). 1. Pipe ( ), brand of tobacco _____? 2. Cigarettes ( ), brand _____, rolls his own ( )? 3. Cigars ( ). 4. Snuff ( ). 5. Chews ( ), brand(s) _____.
b. Drinks to excess ( ), moderately ( ), never ( ). 1. Type of beverage preferred _____.

MISSING PERSONS DATA SHEET (Cont'd)

21. (Cont'd)
c. Drugs or sedatives used to excess ( ), moderately ( ), never ( ). 1. Kind of drug used _____. 2. Kind of sedative used _____.
d. Gamble? ( ), horseracing ( ), cards ( ), dice ( ), lotteries ( ), other _____.

22. Habitat: Is subject known to frequent the following types of places? (check if yes) a. Taverns ( )? b. Lodges ( )? c. Pool halls ( )? d. Libraries ( )? e. Public auctions ( )? f. Summer resorts ( )? g. Dance halls ( )? h. Others, specify _____.

23. How was subject dressed when last seen (describe in detail--did clothing contain any laundry or cleaners' marks)? _____
Name of commercial laundry or cleaner used _____
a. Hat or cap (type, size, make, color, pattern, etc.) _____
b. Coat, sweater or jacket (type, material, size, make, color, pattern, etc.) _____
c. Shirt or blouse (type, material, size, brand, color, pattern, etc.) _____
d. Necktie, neckerchief, or scarf (material, brand, color, type, pattern, etc.) _____
e. Belt or suspenders (type, material, size, color, describe buckle, etc.) _____
f. Trousers, slacks, overalls (type, material, color, size, brand, pattern, zipper or button fly, etc.) _____
g. Dress or skirt (type, material, color, size, brand, pattern, etc.) _____
h. Stockings or socks (type, material, size, color, pattern, leg garters, etc.) _____
i. Shoes, boots, or slippers (type, size, materials, laces or buckles, straps, color, types of heels, high, low, rubber, leather, composition, types of soles, rubber, leather, composition) _____
j. Overshoes (low rubber, boot, zipper or buckle type, size, brand, color, material, etc.) _____
k. Underwear: List size, color, brand, material, and type for each of the following:
1. Underpants _____
2. Undershirt _____
3. Brassiere _____
4. Girdle, corset _____
5. Garter belt _____
6. Slip, petticoat _____

24. Clothing preference, style and color _____

25. Date when subject was last seen _____ and by whom _____ Time _____

26. Where was subject last seen? _____

27. With whom was subject last seen? _____

MISSING PERSONS DATA SHEET (Cont'd)

28. Sources of above information: _____

29. Who is reporting subject missing (name and address) _____

30. With whom did subject live? _____

31. Is there any reason to believe foul play _____, marital discord _____, financial difficulties _____, other _____?

32. Names of persons known to be hostile: _____

33. Mental attitude at time of disappearance: depressed ( ), melancholy ( ), dissatisfied ( ), happy ( ), etc. _____.

34. Subject's closest friend or intimate: _____

35. Companions, of opposite sex: _____

CHECKING AUTOMOBILES IN HIT AND RUN CASES

(See Figure 20.)

EXAMINE EXTERIOR SURFACES FOR CLOTHING, FIBERS, HAIR, BLOOD, TISSUE, ABRASION MARKS IN PAINT, DUST OR GREASE, IMPRESSIONS OF FABRIC--MARKS OF VICTIM'S CLOTHING.

Check and Examine Progressively. Don't skip around car.

FRONT
LEFT SIDE
RIGHT SIDE
REAR
TOP
UNDERNEATH

Record location, date, and time the car was checked.

Check the following:

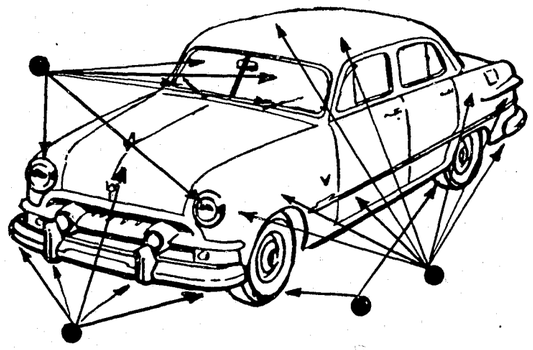
License plates, securing bolts, and nuts (recently replaced?)
Record motor and body numbers, year, model, etc.
Was engine or radiator warm?
Take speedometer mileage totals. Was it operating? Was gas gauge operating? Check contents of gas tank.
Ornaments--radiator, etc. Breaks, fractures, bent? Any parts missing?
Tires--evidence recent skidding? Bent rims? Location. Record make, location--R or L; F or R. Take notes on tread patterns. Location (wheel)
Were foot and emergency brakes operating? Note condition.
Was horn operating?
Examine door handles, bumpers and bumper guards, hinges, protruding parts for foreign material adhering to protruding parts--fabric, blood tissue.
Exterior surfaces--windshield, L & R windows, hood, fenders, L & R, running board, radiator and radiator grille, core and shell for fabric or fiber impressions.
Headlight, foglights, stoplight, spotlights, parking lights, turn or signalling lights--were they working properly? Bright or dim? Broken lenses?
Bent light rims? Broken glass? Recently replaced? Recover and retain all broken particles of glass found. Keep separated as to sources.
Check underneath--grease fittings, crankcase pan, axle and axle housing, differential, spring shackles and bolts, fabric abrasion marks, pieces of fabric or fibre.
Make notes. Color of paint. Two tone? In taking standard samples for comparison, remove paint flakes to base metal including primer coat.
Evidence of recent servicing stickers--lubrication, oil change, etc. Date and mileage recorded on such stickers.
After checking car, was there evidence of a commission of a crime or a violation of traffic laws in operation of this vehicle?
In cases involving abandoned vehicles, recover and preserve all personal property, papers, etc. from vehicle. Check glove compartment, trunk, rear seat, shelf behind seat, and remove and check under all seats.

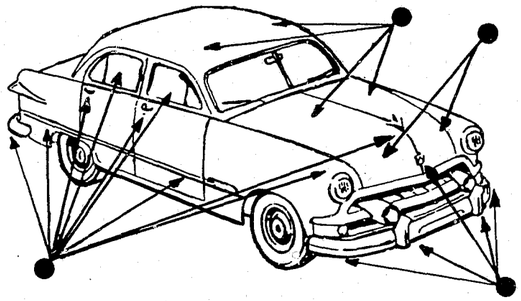
Fig. 20 VEHICLES: AREAS DEMANDING ATTENTION

CHECK AND EXAMINE PROGRESSIVELY - DO NOT SKIP AROUND CAR

FRONT

LEFT SIDE



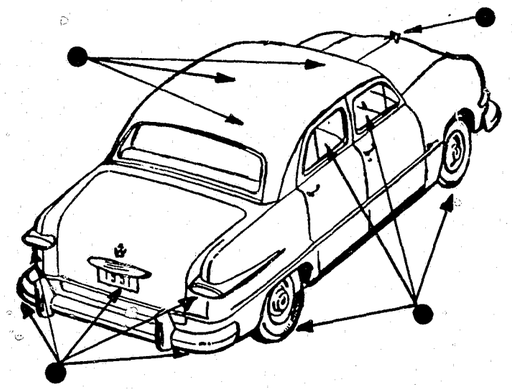


RIGHT SIDE

REAR

TOP

UNDERNEATH



Source: Wisconsin State Crime Laboratory

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

PHOTOGRAPHY AND THE PRESERVATION OF TIRE AND FOOT IMPRESSIONS

The applications of photography in modern criminal investigation have been advanced to the point where they can now be considered as indispensable aids in preserving and presenting graphically many types of physical evidence.

Photography also is an important and reliable means of preserving many surface conditions which are encountered in an investigation where the original object is too large or too cumbersome to be transported to the laboratory. If proper photographs are taken of such surfaces and objects, and the original negatives are sent to the laboratory with the necessary information, the basis of information essential in many types of investigations can be established.

Experience has indicated that in any photograph taken in an investigation where the size or dimensions of the object are important, scaled photographs should be taken. The resulting negatives will then correctly and accurately depict the original object as it appeared when first encountered in the investigation. If a scale is used accurate measurements can then be made from the photograph.

Photographic negatives of the type referred to should, of course, be taken by employing the proper type of illumination and the proper angle. In addition, the processing of the negative incidental to development and fixing and washing should be properly carried out. All negatives should be taken so that the important area of the object receives the sharpest focus. When scaled photographs are made of a plane surface the camera should be placed so that the optical axis of the camera is at 90° to the plane surface of interest. Also the plane of the ground glass or film should be parallel to the plane surface being photographed. Out-of-focus negatives or negatives which have been imporperly processed are of little or no value if offered as evidence and may be excluded by the trial court.

Flash photographs employing flash bulbs as a source of illumination are quite satisfactory when taking general crime scene photographs. However, in taking photographs of toolmarks, surface alterations of metals, paints, etc., such flash photographs are usually not satisfactory. Since in photographs of this type the proper angle of illumination is quite critical as is the camera viewing angle, the image of the area of interest should be clearly visible on the camera ground glass before the exposure is made. This is not possible when taking photographs employing flash bulbs as a source of illumination. Either spotlights or floodlights should be used as a source of illumination. The spotlights or floodlights should be placed in the proper location and directed at the proper angle so as to properly reveal the surface texture and detail of interest as clearly as possible. Photographs of the latter type should always be taken, while including in the field of view of the camera one of the paper scales (Fig. 21 and Figure 22).

This paper scale should be placed so as not to obscure any portion of the object which is of interest or value.

There are many types of photographic emulsions commercially available today. The characteristics of these emulsions which distinguish one type from another depend upon the following factors: 1. spectral sensitivity of the emulsion; 2. speed and grain size of emulsion; and 3. the degree or relative contrast in terms of black and white.

All of these factors must be taken into consideration in making the proper selection of film for a particular purpose. A record should be kept indicating the particular type of emulsion employed in making each photograph taken in the course of an investigation. If the negative is to be sent to the Laboratory, this information should also be made available to the Laboratory.

The recommended procedure for the proper marking of photographic negatives is as follows: After the negative has been developed, fixed, washed and dried, the initials of the photographer who took the photograph and the date the negative was made should be placed on the transparent, unexposed margin of the film. Other pertinent information, such as case number, etc., can also be included. It enables the photographer to properly identify the particular photograph. If these identifications are placed on the film on the shiny side they will appear, without being reversed, in any prints made of the entire negative. Under no circumstances should any alteration of the photographic image in the field of the negative be attempted by touching up, or by chemical intensification or reduction of the negative image.

It is suggested, when the Laboratory is requested to evaluate objects or materials appearing in photographs, that the original negative be sent to the Laboratory so that we may make our own prints from any negatives submitted. This is particularly important in gunshot cases involving powder or shot patterns, since it will be necessary for us to make 1:1 photographs of the original object for purposes of comparison. If this is to be done, the Laboratory must have available the original negative so that we may enlarge this photograph to the proper size. In such cases the particular scale in the field of the picture should also be made available. In all cases, before the scaled photograph is taken the scale itself should be initialed, preferably in ink, by the photographer, and, in addition, the date and name of the case should be included on the scale. This marked paper scale should then be sent to the Laboratory with the original scaled photographic negative as has been explained.

The size of the photographic negative is relatively unimportant, although the Laboratory recommends that, where possible, the photographer should not use 35 millimeter or smaller sizes of film in the taking of still photographs. The smallest size of photographic negative which should be employed in law enforcement work is

the fixed focus finger print camera having a 2¼" x 3¼" negative. The use of 35 millimeter, 16 millimeter, or 8 millimeter photographic materials should be confined to motion pictures only. Crime scene photographs should be made using as a minimum size a 4" x 5" negative.

In taking scaled photographs of foot or tire impressions, do not point the camera at an oblique angle toward the ground. Such a photograph is useless for purposes of comparison, identification, or elimination of suspected tire treads or impressions. Suggestions concerning the proper taking of such photographs are included elsewhere in this manual.

Important photographs taken in the course of an investigation should first be taken and the negatives immediately processed. It should be borne in mind that any camera is a mechanical device subject to mechanical failures. If the shutter fails to operate, or if for some other reason the photograph of the body of a victim in a murder case is not properly photographed, this photograph cannot be retaken at a later date. In connection with photographs of the type indicated, bear in mind that any photographs offered as evidence but taken after the body of the victim has been moved or after the scene has been altered will probably be excluded by the trial court judge.

All photographs taken in the course of an investigation should be taken for the purpose of obtaining a graphic and accurate record of the scene or locale of interest just as it was seen or encountered. Each photograph should be taken with a specific purpose in mind. If it is at all possible, all unauthorized persons should be excluded from the scene until the proper scene photographs have been taken.

If photographic difficulties are encountered by law enforcement agencies or if the agencies need assistance in connection with routine or special photographic problems encountered, the Laboratory is ready and willing to assist and counsel so that the required photographs may be accomplished.

The Laboratory field unit, when called upon to assist in the conduct of a major investigation, has as a part of its equipment all necessary photographic equipment and apparatus for making proper photographs at the crime scene or locale of interest.

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Preservation of Tire and Foot Impressions

At the crime scene all tire and foot impressions that are believed to be connected with an investigation must be preserved. This should be done immediately by means of a scaled photograph. Then, three dimensional casts of the impression should be prepared so that subsequent comparisons may be made.

Photographing the Impression. When photographing a foot impression, two scales should be used. One scale is to measure length; and the second scale, the width. When photographing a tire impression, only one scale need be used. It should be placed immediately adjacent to the impression. Any scale used must not obscure any portion of the impression. Mount the camera on a tripod. Place it directly above the center of the impression and point it straight down with the plane of the film parallel to the surface of the impression. (See Figure 45.) After the camera has been adjusted and focused, make sure that the tripod legs will not be in the photograph. Then photograph the impression as it was first observed. All loose foreign material, such as twigs, pebbles, leaves, etc., should then be removed and the impression photographed again.

In the removal of foreign objects from the impression, care must be exercised. It is suggested that a pair of tweezers be used in preference to fingers. Excessive amounts of moisture, can be removed from the impression by using an ordinary blotter, or piece of cotton, and a pair of tweezers. Tear the blotter, or cotton, into small pieces. With the aid of the tweezers these small pieces can be carefully moved about in the impression, thereby absorbing the unwanted moisture. Caution must be exercised so that the surface of the impression will not be altered or damaged.

If auxiliary side lighting, such as a No. 5 flash bulb or a photoflood lamp, is to be used for illumination, the lamp should be at a low oblique angle. When photographing shallow impressions place the light about 4 feet from the impression and as near to the ground surface as possible. However, the illumination should be at a higher angle when photographing deep impressions.

After the film has been exposed and developed, the negative should be examined to ascertain whether or not it is satisfactory.

Often tire and foot prints are found on plane surfaces such as boards, roof tops, floor surfaces, or loose papers, etc. It is not possible to make three dimensional casts of these prints. They must, therefore, be preserved by means of scaled photographs. When photographing these prints the photographer must experiment with the location of the light source. It is suggested that a flashlight with a flood beam be used. Hold the light at various angles from the side of the print until the details of the print can be clearly seen on

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

the camera groundglass. After the correct angle of illumination has been determined, place the camera flashgun at the same angle when making the exposure. This angle must be determined anew for each print photographed.

After a satisfactory negative has been obtained, the object on which the print was found should be carefully recovered, properly marked, and packed for shipment to the Laboratory.

Casting the Impression An estimate of the amount of plaster of Paris and water required must be made. The thickness of the negative cast should include the depth of the impression plus one and one-half inches. A cast 13 inches by 6 inches by 1½ inches will require approximately 2 quarts of water and 6 to 7 pounds of dry plaster of Paris. After the estimate of the necessary materials has been made, the proper size retaining frame, with the inner surfaces greased to assure easy separation from the plaster cast, should be placed around the impression. This frame can be constructed of wood, cardboard, or metal, and should exceed the size of the impression by at least one-half inch on all sides, and should be well banked with dirt on the outside to avoid escape of plaster. Prior to pouring the cast material, check the impression to make sure that it is free of all loose foreign material.

When mixing plaster of Paris and water, it is recommended that the plaster of Paris be sifted into the water. The mixture is to be agitated constantly by a kneading action of the hand. This kneading will minimize the possibility of air bubbles and chunks of dry plaster remaining in the mixture. Dry plaster of Paris is added until the mixture is of pancake-batter consistency. This method of sifting the dry plaster of Paris into the water helps to avoid premature setting.

To avoid error in the estimate of the amount of water needed, it is suggested that at first a small amount of water be used. Continue adding more water until the desired quantity of the mixture with the proper consistency has been attained.

In pouring mixed plaster into the cast and frame, care must be exercised so that the plaster will flow on the surface of the impression without altering the details of the impression. A satisfactory method of pouring the plaster into the impression is to hold a board or similar object at an angle immediately above the impression while pouring the plaster on the board, thus permitting the plaster to run down the board and into the impression.

When the cast is about half poured, reinforcing wire should be added to the cast so that it will be mechanically strengthened. (See a, Figure 46.)

Wire mesh, having two or three wires to the inch and bent in a zig-zag form, laid to form a lattice is ideal for reinforcing plaster

casts. Reinforcing with wood is not recommended.

After the reinforcing mesh has been laid in the cast, the remainder of the plaster should be added before the plaster from the initial pouring has set.

Marking the Cast for Identification. The cast, prior to complete hardening, should be marked with the initials of the person who made it. In addition, the time, date, name of case or offense, and location of the impression should be included. (See b, Figure 46.)

Removing the Cast. Plaster of Paris mixtures usually harden in about 45 minutes, depending upon atmospheric conditions. However, when the cast has become cool, it may be removed from the impression with an additional 30 minutes being allowed before removing the frame. (See c, Figure 46.)

Control of Hardening Time. Plaster of Paris mixture will harden more rapidly if one-half teaspoon of salt is added to each pint of water used. The hardening time may be retarded by adding one teaspoon of granulated sugar per ten parts of water.

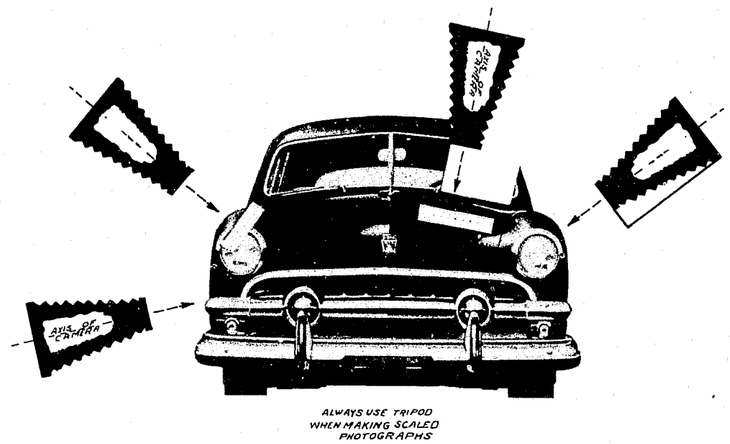
Impressions in Powdery or Granular Material. If an impression is found in dust, sand, powdery or granular material, it must be coated with at least three layers of shellac, or lacquer, to minimize the possibility of damage to the powdery or granular material when the plaster of Paris mixture is poured into the impression. The lacquer, or shellac, can be applied with a hand operated insect spray gun. Direct the nozzle of the spray gun against a piece of board so that the mist from the gun is deflected from the board to the impression. After the last coat of shellac or lacquer has hardened, it is recommended that the impression be given a final spraying with a light grade of clean machine oil. This will prevent the shellac, or lacquer, from adhering to the cast.

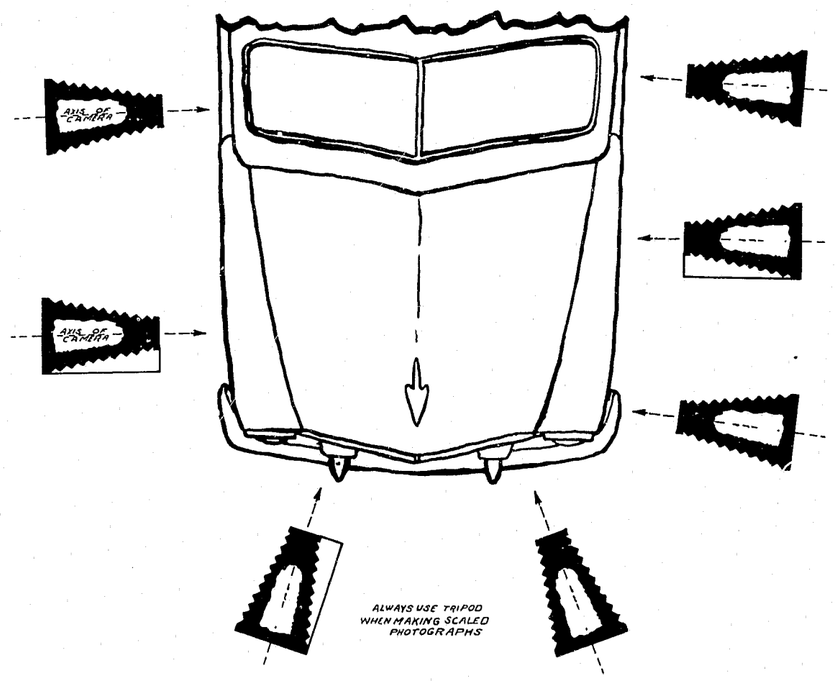
Impressions in Mud. When an impression is found in mud, covered with water, it becomes necessary to drain the surplus water to a depth of about one inch. This can be accomplished by using a bulb-type syringe, syphon hose, or a straw. However, it is important to minimize the disturbance of the water. After the proper water level has been attained and a retaining frame placed around the impression at least equal in height to the depth of the water, the dry plaster of Paris is sifted into the water remaining in the impression. After the plaster and water mixture has reached a depth of about 1 inch, the reinforcing wire should be added. Then more dry plaster of Paris should be sifted into the water remaining in the impression. Allow ample time for the cast to set.

Impressions in Snow. A simple method for the reproduction of impressions in snow is to sift the dry plaster of Paris into the impression and spray lightly with cold water. First take all precautions pre-

scribed in earlier paragraphs, not overlooking the taking of scaled photographs prior to casting. Sift a thin layer of dry plaster of Paris into the impression to a depth of about 1/8 inch using a piece of cheese cloth over an ordinary window screen as a sieve. Spray the dry plaster of Paris with a fine spray of cold water until it is completely saturated. Apply another layer of plaster, and another thorough spraying after the first layer has partially set. Follow this procedure until a strong base has been built. Then pour in additional plaster which has been mixed prior to the completion of the cast foundation, add the reinforcing mesh, and finish pouring the cast. It is suggested that this method be practiced several times before using it to cast an impression of value. If there is a danger of freezing, it is recommended that a thick plaster mixture be used so that the danger is minimized.

Fig. 21 SCALED PHOTOGRAPHS– VEHICLES





Source: Wisconsin State Crime Laboratory

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

INSTRUCTIONS FOR USE OF SCALES SHOWN IN FIGURE 22

Reproduced in Fig. 22 are one dozen metric scales, twenty centimeters long, (200 millimeters with the smallest division being one millimeter) for the convenience of law enforcement agencies when taking scaled photographs of crime scenes and evidence.

Procedure for Using a Scale

1. Cut all or a part of one scale from the page.

2. Attach the scale to a stiff cardboard with the aid of scotch tape or similar means and cut to the size of the scale.

3. Initial and date the scale used in order that the negative and photographs prepared from it may subsequently be properly identified in court.

4. Place the scale in the field of the camera near to, but not obscuring, the object being photographed (e.g. footprint, tire impression, fingerprint, toolmark, knife, gun, damaged auto part, bullet holes, powder pattern on skin, etc.).

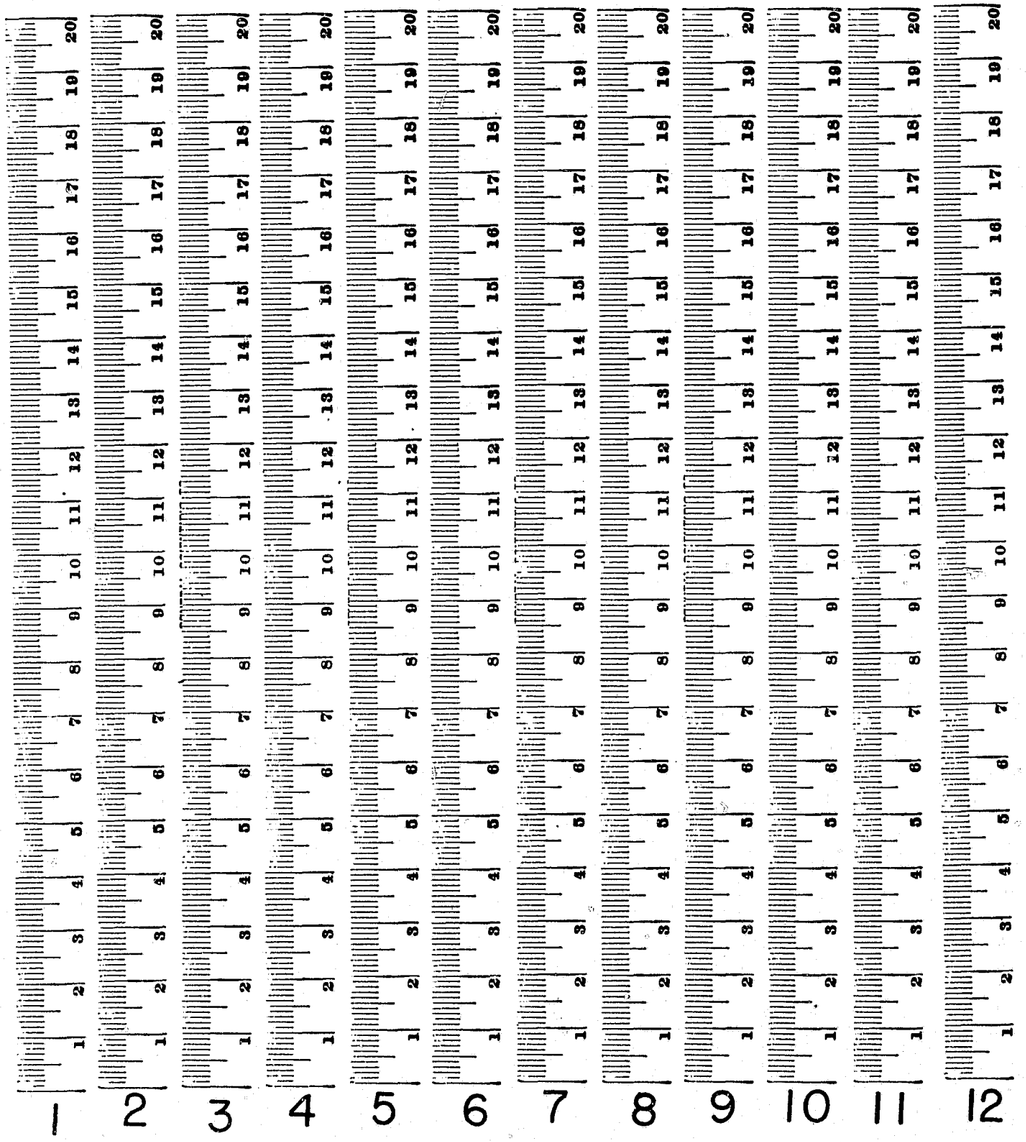
5. Focus the camera so that the object being photographed and the paper scale are both in focus. It may be necessary to adjust the position of the paper scale in some instances in order to place it in the same plane of focus as the object of interest. Care should be taken so that the scale is in focus from one end to the other and not canted or curved.

6. Develop the negative, wash, dry and forward to the State Crime Laboratory with the initialed paper scales which were used in the field of the camera when the negatives were exposed. Necessary enlargements from this negative, permitting desired examination or comparison, will be made at the Laboratory and the negative returned to the submitting agency. This will permit the making of necessary enlargements of the negative to reproduce the exact size of the object of interest which had been photographed.

It is felt that the proper use of these scales in the taking of crime scene and evidence photographs will enhance the effectiveness of both the law enforcement agency and the State Crime Laboratory.

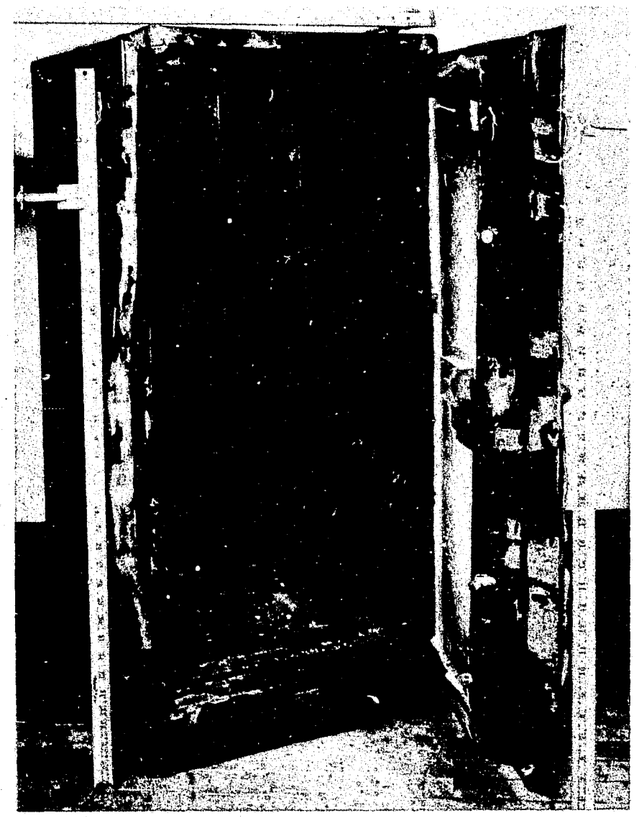
Fig. 22 PHOTOGRAPHIC SCALES

See preceding page for instructions



Additional metric scales, unnumbered, may be obtained from The Central Scientific Co., 1700 Irving Park Road, Chicago 13, Ill., Catalogue No. 73055, at 15 cents per dozen.

Fig. 23 PROPER METHOD OF TAKING SCALED PHOTOGRAPHS OF BURGLARIZED FIRE CABINET OR SAFE



Note jimmy or pry bar tool marks along edge of door and in left front of opening.

Photograph of this type should be taken and prints made available to the Laboratory with other information suggested in the Burglary Section of this manual. Either tool marks should be cut out without heating cabinet or safe. Parts such as drilled or punched combination lock should be removed and forwarded to the Laboratory or the safe itself, if not too large.

Source: Wisconsin State Crime Laboratory

EVIDENTIARY CONSIDERATIONS IN SEX OFFENSE INVESTIGATIONS

On the following pages is a diagramatic and textual presentation of the evidentiary considerations of importance in the investigation of sex offenses. The more important sexual offenses or perversions are presented in six main groups, headed by the numbers 1.0 to 6.0. In some instances the "offense" as listed on the diagrams is not specifically covered by statute in this state, such as masturbation, necrophilia, and masochism. However, sexual practices of this character may be an attendant factor in the commission of an act that is prohibited by law, such as in indecent exposure (exhibitionism), assault, indecent liberties, behavior of a sexual psychopath as defined by Section 51.37 Wisconsin Statutes, and others.

The diagrams are arranged to suggest to the investigating officer the course to be taken in the investigation of sex offense cases, pointing out the information and physical evidence warranting consideration by the investigator and examination by the State Crime Laboratory where assistance is required. The numerical references in each of the diagrams refer to paragraphs in the text, which is set out in six sections.

With respect to the information desired (such as the outcome of a complete medical examination of the participants in the sex offenses, given in each instance), it is suggested that the investigating officer make known those factors of importance as listed in the text to the **examining physician,** to the laboratory in their examination, and to the officer in his investigations. It is recommended that the examining physician be permitted to inspect that particular part of this section dealing with his examination.

In the course of investigating sex offense cases, it is suggested that the investigator be alert for indications of an abnormal sex interest on the part of the participants or suspects. Such indications may be in the form of pornographic material (letters, models, pictures, records, etc.) "condoms" in quantity, artificial penis ("dildo"), defaced pictures from magazines and the like. Such articles may be found among the personal effects of the suspect or participants of homosexual or sadistic practices or at the crime scene. In each instance these articles must be carefully handled to preserve fingerprints, be properly preserved, marked, and packed.

In the event that a situation arises where the investigating officer is in doubt as to how to proceed in the proper collection, preservation, labeling, and packing of physical evidence (see above

"Collection, Labeling, etc. of Physical Evidence") or if any questions arise as to course of the proper action to be taken in cases where laboratory assistance is sought, it is suggested that the State Crime Laboratory be contacted by phone, letter, wire, or State Traffic radio for consultation and recommendations.

Rape, Forcible Rape, Statutory Attempted Rape, Etc.

1.1 MEDICAL EXAMINATION. The victim must immediately be taken to a competent physician, registered to practice medicine in the State of Wisconsin, for examination. The medical examination of the victim in the type of sex offense being considered should be concerned with the following:[1]

(a) The presence or absence of lacerations, bruises, abrasions, or tears on the body. The nature, location, and character of these marks should be precisely recorded. Particular attention should be directed to the neck, knee, breast, and thigh areas. If these marks are present, scaled photographs should be taken. For details, see above pages.

(b) The condition of the pubic area, the external labia, and the vaginal canal. The appearance and condition of the hymen. Whether or not any blood is present in the vaginal canal, on the labia or pubic area. Information regarding whether or not the victim was menstruating at the time of the offense.

(c) A vaginal smear should be taken. If no person is available who is competent to examine the vaginal smear, the slide is to be forwarded to the Crime Laboratory without staining.[2]

(d) The presence or absence of a muco-purulent discharge, and, if present, a specimen should be taken for bacteriological examination.

(e) The appearance of the victim to determine whether or not there is exhibited any indication of narcosis or drunkenness. If there are indications of narcosis, signs of addiction should be searched for, possibly in the form of scarring of the skin from the use of a needle or razor blade. Some symptoms or indications warranting suspicion of the subject as being under the influence of narcotics

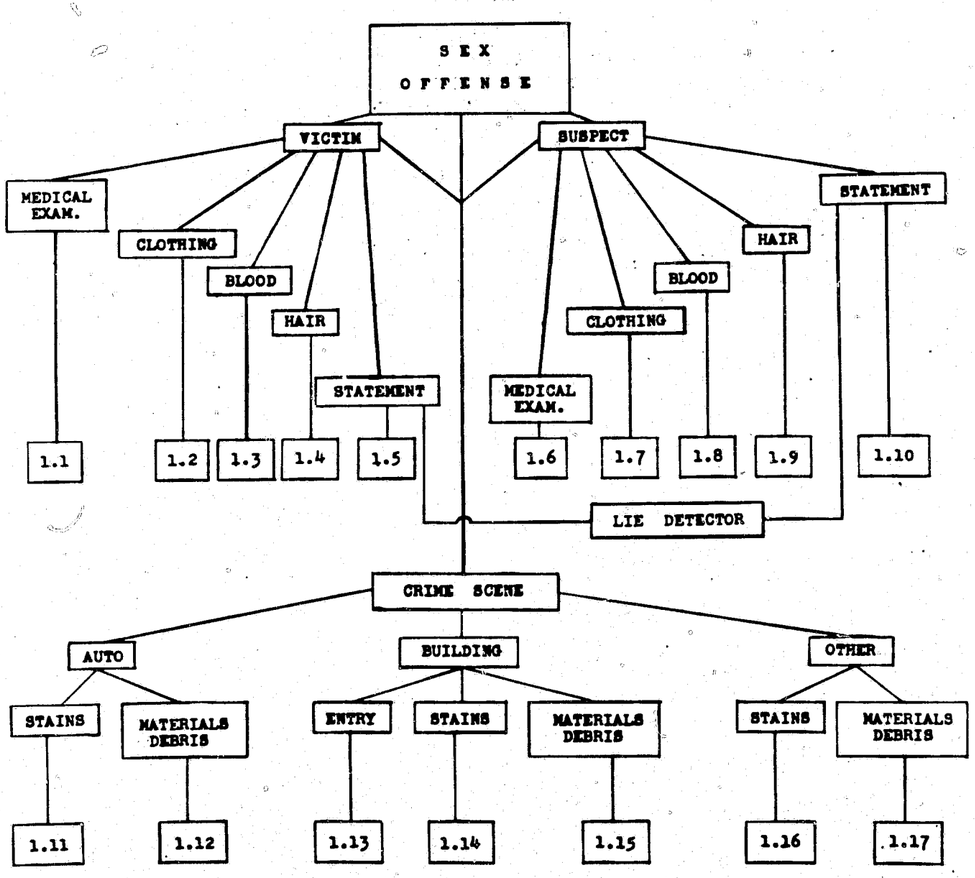
---

[1] If the subject is dead, see first articles of this part.

[2] Place a clean slide over the slide bearing the stain so that the stain is protected, tape the slides together. Scribe date, name of person from whom smear was taken, and initials of person taking smear on slide bearing stain. Pack in cotton and ship to the Laboratory.

Fig. 24 INVESTIGATION OF SEX OFFENSES 1.0

RAPE, FORCIBLE
RAPE, STATUTORY
ATTEMPTED RAPE
INDECENT LIBERTIES
ADULTERY
INCEST



Source: Wisconsin State Crime Laboratory

or undergoing the effects of the need for a narcotic include muscle twitching, muscle cramps, excessive thirst, throat dryness, coughing, yawning, hallucinations and perforation, ulceration or inflammation of the nasal septum (cocaine, heroin). If the use of opiates is suspected, at least 200 c.c. of urine should be recovered and placed in a clean glass jar with a tightly fitting cover, labeled, properly sealed, and submitted to the Laboratory for examination. If the victim appears to be under the influence of alcohol, a blood sample of a least 10 c.c. should be drawn, citrated (30 mg. of sodium citrate), labeled, properly sealed, and submitted to the Laboratory for examination. See Fig. 5.

(f) Incidental to the examination of the pubic and vaginal regions of the victim, particular attention should be directed to the possible presence or absence of foreign material or blood which may be adhering to the pubic hairs or to the skin surfaces of the lower abdomen or to the thighs. This material should be carefully removed and preserved for a subsequent examination in the Laboratory. The foreign material adhering to pubic hairs should be removed by carefully cutting the hairs. The hairs should then be placed in a clean rigid container (not an envelope), such as a glass vial or test tube (see Fig. 6, container numbers 6 and 7). Stains or foreign material should be removed with the aid of a clean cotton swab (such as an applicator) soaked in saline in the case of blood and distilled water in the case of suspected seminal stains. The entire swab should then be placed in a clean test tube and the tube labeled, properly sealed, and forwarded to the Laboratory.

(g) Fingernail scrapings should be taken from the victim at the time of the medical examination. A clean scalpel should be used and the material recovered from each fingernail placed in separate containers. The suggested method of containing the debris recovered is by placing it in a "druggist's fold" and then placing this in a clean envelope, which should then be labeled, properly sealed, and forwarded to the Laboratory.

1.2 CLOTHING. The clothing worn by the victim at the time of the offense must be properly recovered and properly preserved immediately. If the victim was wearing a sanitary napkin at the time of the offense, this napkin must also be recovered for examination at the Laboratory. There is a general tendency for the victim or her family to launder the soiled garment and to dispose of the soiled sanitary napkin as soon as possible. Examinations to corroborate offenses of this type are not feasible after the garments have been laundered. The clothing of the victim should be recovered and submitted even though it is known that her assailant did not have an emission as the result of the commission of the offense. The clothing suspected of containing seminal staining must be handled as little as possible. If the stains are wet or partially wet, they should be allowed to air-dry without the aid of a fan. Clothing of the victim must be kept separate from that of the suspect at all times. Each

article should be properly marked for purposes of identification and separately wrapped. It bears repeating that at no time must the clothing of the victim and that of the suspect come into contact with one another else the evidentiary value of the physical evidence present on the clothing be lost. No attempt should be made to remove any adherent foreign material from the garments either of the victim or the suspect, and under no circumstances should the garments be shaken, rubbed, or cleaned. See Figs. 8 and 9, and accompanying pages, for the proper method of wrapping, labeling, and shipping clothing evidence.

1.3 BLOOD. In offenses where there is blood staining present on the clothing, effects, or surrounding area at the crime scene, a sample of whole blood should be taken from both the victim and the suspect. Where the blood stains are found to be wet, they should be allowed to air-dry without the aid of a fan. At least 10 c.c. (approx. 1/3 oz.) should be obtained by a registered nurse, physician, or medical technician and an anticoagulant (such as sodium citrate, 30 mg., a quantity about the size of an average pea) added to the sample in order that blood alcohol and blood typing tests may be conducted. In collecting samples for blood alcohol determinations (as for carbon monoxide) the container should be filled to the top leaving as little air space as possible.

1.4 HAIR. In the offenses being considered, hair samples for comparison purposes should be obtained from the head and the pubic region of the victim and the suspect as well. The minimum number of head hairs required is considered to be at least fifty hairs, and of pubic hairs, at least thirty. The suggested procedure for taking the hair samples is to comb the head or pubic region with a clean comb and to place the hairs so collected in a clean envelope (excepting where foreign material is present, then use a rigid container). If this method does not yield the necessary number of hairs, it then becomes necessary to cut the rest that are needed. If the victim is deceased, however, the hairs should be pulled out by the roots.

1.5 STATEMENTS. See sections below, "Polygraph (Lie Detector) Tests and Interrogation of Witnesses" and "Interviewing Witnesses." Where Laboratory assistance is requested, all statements made by the victim, suspect, and all witnesses, investigation reports, and a summary of the facts and information available regarding the commission of the offense should be sent to the State Crime Laboratory and the District Attorney. This is particularly necessary where it is anticipated that use of the lie detector is to be made. The most advantageous use of the lie detector is made when all possible facts regarding the offense have been developed by the investigating officers.

1.6 MEDICAL EXAMINATION. See above paragraph 1.1, sub-sections (a), (e), (f), and (g). The urethra should be expressed in an attempt to produce an exudate which may be examined for the presence or absence

of live spermatozoa. Particular attention should be directed to indications of venereal disease. If gonorrhea is suspected, a slide must be prepared of the spirulent material recovered and an examination conducted by the bacteriologist for gonococci. If syphilis is suspected, 10 c.c. of additional whole blood should be collected, citrated (see paragraph 1.3), and sent to the medical technician for a Wassermann test. Attention should also be given to skin damage and subcutaneous hemorrhage of the penis. If the subject is dead, see above pages.

1.7 CLOTHING. The clothing of the suspect must be immediately recovered and properly preserved. Often time elapses, and this allows the suspect to change clothing from that which he was wearing at the time of the offense. In this event every effort must be made to ascertain what garments he was wearing at the time and procure them, preferably by warrant. The clothing obtained must be wrapped separately from that of the victim and each item wrapped separately. Each article must also be properly marked for purposes of identification (see section above "Collection, Labeling, Etc. of Physical Evidence" as well as paragraph 1.2 of this section).

1.8 BLOOD. See paragraph 1.3. Blood should be collected from the suspect if any blood has been let as a result of the commission of the offense, whether it be from the victim or possibly from the suspect.

1.9 HAIR. See paragraph 1.4.

1.10 STATEMENT. See paragraph 1.5.

1.11 CRIME SCENE--AUTO--STAINS. Where an automobile is the scene of the crime, particular attention should be given to the presence or absence of blood stains and/or seminal stains. Blood stains are, of course, usually readily visible. Seminal stains, however, are more difficult to see. A seminal stain may be colorless in daylight or slightly yellow. The stain has a starchy feeling when carefully touched with the fingers. Miscellaneous articles, such as handkerchiefs, rags, cleansing tissues, scraps of paper, and other articles found in the automobile may have been used by the perpetrator in wiping himself after an emission and should be properly preserved, properly marked, and submitted for examination. "Condom" packages and keepers should be searched for, properly marked and preserved. If at all possible, it is suggested that the automobile involved in a sex offense be made available to the Crime Laboratory in Madison for processing.

1.12 CRIME SCENE--AUTO--MATERIALS, DEBRIS. Evidence of importance may also be contained in the debris present in the automobile, adhering to the upholstered surfaces or present on the inner or outer surfaces of the auto. This may include fingerprints, palm prints,

hairs, clothing fibers, buttons, clothing fasteners, soil, "condoms", "condom" packages and wrappers, personal effects, and so on. Particular attention should be directed to footprints and tire impressions that may be on the ground about the car, which may have been made at the time of the offense. It is again suggested that the automobile be made available to the Crime Laboratory for examination and processing.

1.13 CRIME SCENE--BUILDING--ENTRY. Where an offense in this group has been committed in a building, an important consideration is the means of entry into the building. If burglary has been committed for the purpose of committing a sex offense, the kinds of evidence that may be involved in any burglary or breaking and entering offense becomes important. (See section above "Burglary Investigations".)

1.14 CRIME SCENE--BUILDING--STAINS. Where the sex offense has taken place in a room, such as in a bedroom, evidence of the act may be present on articles -- in the form of blood or seminal staining. Any article upon which there may be a stain connected with the offense should be submitted to the Laboratory for examination. Bedclothing, sofa cushions, rugs, and the like should be handled as little as possible, properly marked, and wrapped. "Condoms", packages and keepers should be searched for, properly marked and preserved. (See section above "Collection, Labeling, Etc. of Physical Evidence" and paragraph 1.2 of this section.)

1.15 CRIME SCENE--BUILDING--MATERIALS--DEBRIS. Miscellaneous evidence may be present at the crime scene which may tend to indicate the suspect's innocence or guilt. This may be fingerprints, palm prints, hairs, clothing fibers, buttons, clothing fasteners, "condoms", packages and keepers, and so on. Also, the suspect, after completing the act, may wipe or clean himself on a handkerchief, his or another's, and abandon it at the scene; or he may use a rag, towel, or some garment that may be handy. When such an article is suspected of containing a seminal or blood stain, it must be properly preserved, marked, and submitted to the Laboratory for examination.

1.16 CRIME SCENE--OTHER--STAINS. Where the sex offense has taken place in the open, evidence of the act in the form of staining may be found on leaves, rocks, soil, discarded paper, rags, cleansing tissue, "condoms", packages, keepers, and the like. Particular care must be taken in properly preserving, marking, and transporting these materials for Laboratory examination.

1.17 CRIME SCENE--OTHER--MATERIALS--DEBRIS. Evidence of a miscellaneous type may be contributed to or taken from a crime scene by the victim and/or the perpetrator. This may include clothing fibers, pieces of fabric, articles of clothing (handkerchief), buttons, clothing fasteners, personal effects, head and pubic hair, "condoms",

packages and keepers, and so on. Special attention should be given to the possible presence of footprints in, leading to, or away from, the area where the offense took place. One should also be alert for possible tire impressions that may have been made by the perpetrator's auto. The investigator should give attention to possible disturbances of the crime scene coincident with the commission of the crime, entering into or leaving the area in which the act took place. Examples of these disturbances are broken or cut branches, cut fence wire, or trampled grass or disturbed ground. Materials for comparison purposes must also be gathered for laboratory examination. These samples may consist of soil, sand, gravel, grass, weeds, leaves, paint from painted surfaces (such as fences, building walls, etc.), grease and oil from roadbeds, and the like.

Sodomy, Pederasty

2.1 MEDICAL EXAMINATION. See paragraph 1.1. Additional considerations that must be given attention in the type of offense being considered are the following:

(a) Recent lacerations, bruising, or inflammation of the anal mucous membrane.

(b) Dilation of the anus, absence of puckering of the anal orifice, and diminishing sphincter grip in advanced cases.

(c) A "funnel-shaped" anus in advanced cases.

(d) The presence of old scars and external piles.

2.2 CLOTHING. See paragraph 1.2. Stains of lubricant may be present on the clothing of the victim. These stains can be readily seen under ultraviolet light.

2.3 BLOOD. Blood, usually the victim's, may be present on the clothing of both the victim and the suspect. The location of the staining, in this instance, is significant. See paragraph 1.3.

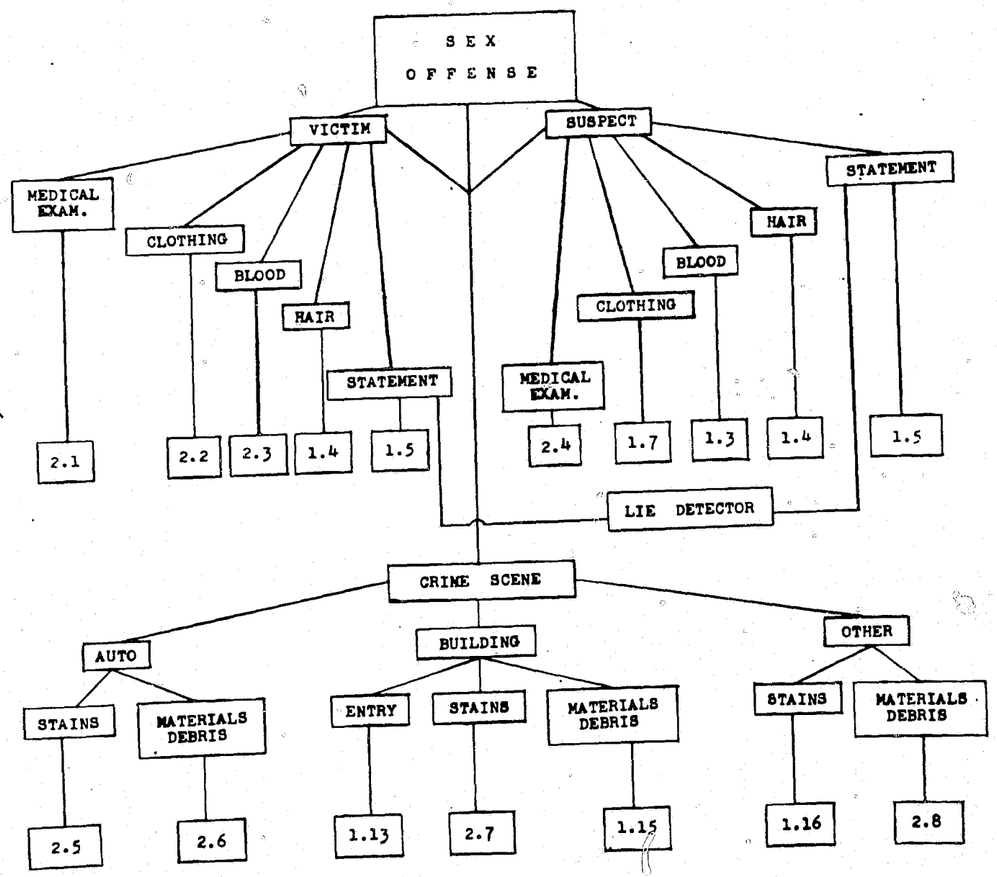
2.4 MEDICAL EXAMINATION. See paragraphs 1.1, 1.6, and 2.1. Particular attention should be directed to the presence or absence of lubricating material on the private parts and pubic region that may have been used in the commission of the offense. Attention should be directed to skin damage, inflammation, or subcutaneous hemorrhage of the penis.

2.5 CRIME SCENE--AUTO. See paragraph 1.11. In addition to blood and seminal stains, the auto should be searched for stains possibly caused by a lubricant used in the commission of the offense.

2.6 CRIME SCENE--AUTO. See paragraph 1.12. Attention should be given to the presence or absence of a container, such as a jar or tube, containing lubricant.

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Fig. 25 INVESTIGATION OF SEX OFFENSES 2.0 **SODOMY**
PEDERASTY



Source: Wisconsin State Crime Laboratory

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

2.7 CRIME SCENE--BUILDING. See paragraph 1.14. Attention should be given to the presence or absence of the container of a lubricant that may have been used in the commission of the offense. This type of material (vaseline, petroleum jelly, etc.) is a common item on the shelf of the medicine cabinet.

2.8 CRIME SCENE--BUILDING. See paragraph 1.17. The area surrounding the location of the commission of the offense should be searched for the presence of a container of lubricant.

Homosexual Practices

3.1 MEDICAL EXAMINATION. See paragraph 1.1, sub-sections (a), (d), (e), and (f), and paragraph 2.1. Attention should be directed to general demeanor of subject, particularly mannerisms or habits that appear to be unusual. Note should be made of the nature of clothing worn by the suspect. Fetichists oftentimes wear underclothing of the opposite sex. See also paragraph 1.6.

3.2 INSTRUMENTS. Instruments or devices are often contrived by homosexual females to substitute for the male sex organ. These artifices may be such articles as a bottle, banana, wiener, broomstick, rags or some other material inside a "condom", a commercially-made penis of hard rubber (often called a "dildo"), and many others. When recovered, these articles should be carefully wrapped and submitted to the laboratory for examination.

3.3 BLOOD. Blood encountered in the offense being considered will, in all probability, be menstrual blood in the case of homosexuals. Bleeding may be caused as the result of masturbation in any number of circumstances, however. See paragraph 1.3.

3.4 STATEMENT. See paragraph 1.5. Attention should be given to any masculine manners of speech or expressions used by the suspect, if a female.

3.5 MEDICAL EXAMINATION. See paragraph 1.1, all sub-sections. Attention should be given to mannerisms or habits of the suspect that appear to be unusual in character.

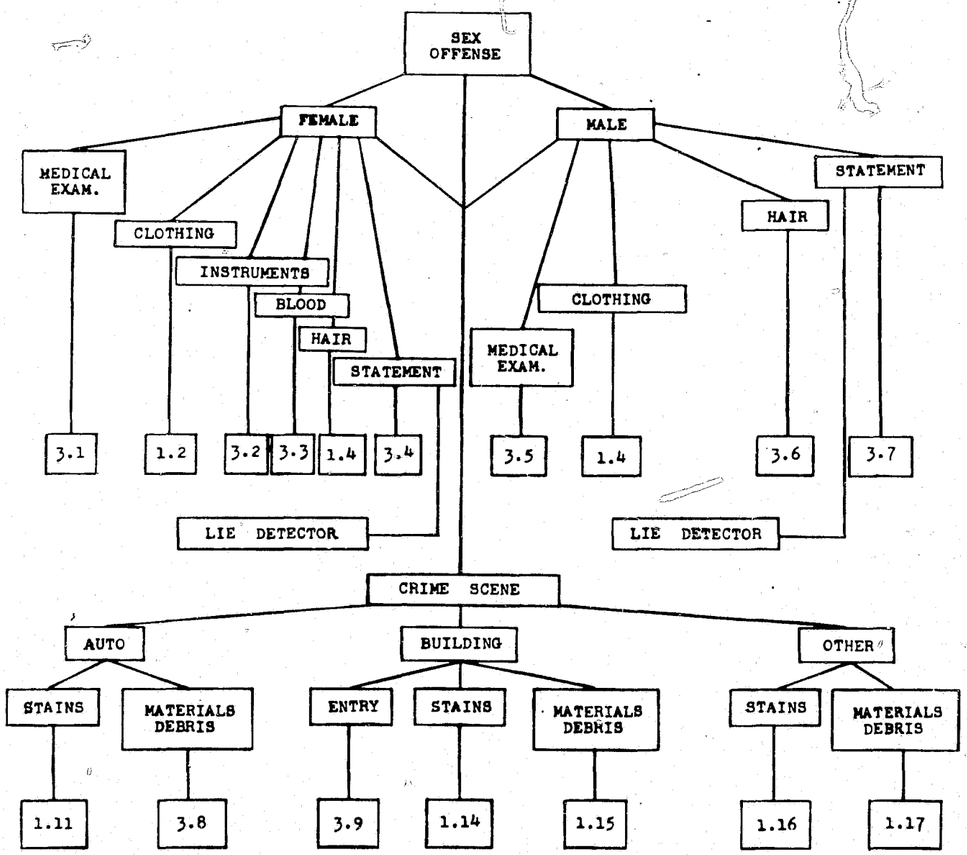
3.6 HAIR. See paragraph 1.4. It should be noted whether or not the suspect has shaved his pubic or axillary hair. This is not uncommon in the case of homosexual men.

3.7 STATEMENT. See paragraph 1.5. Attention should be directed toward the use of manners of speech and expression, and dress of a feminine character, if suspect is a male.

3.8 CRIME SCENE--AUTO. See paragraph 1.12. Articles of clothing, or parts of clothing, found to be present in the automobile should be preserved, marked for identification and submitted for examination.

Fig. 26 INVESTIGATION OF SEX OFFENSES 3.0 HOMOSEXUAL PRACTICES

MASTURBATION
FELLATIO
EXHIBITIONISM
FETICHISM



Source: Wisconsin State Crime Laboratory

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

3.9 CRIME SCENE--BUILDING. See paragraph 1.13. It is not unusual for the fetichist to break into a residence for the purpose of stealing garments of the opposite sex.

Sadism and Masochism

4.1 MEDICAL EXAMINATION. See paragraph 1.1, sub-sections (a), (d), (e), and paragraph 1.6. Particular attention should be given to the precise location and nature of lacerations, bruises, and other marks. Scaled photography of these areas should be undertaken for purposes of record. See section above "Photography in Preserving Physical Evidence."

4.2 INSTRUMENTS. Particularly in the case of masochism, and also in the case of sadism, instruments and devices are contrived by the participant to bring pain to himself or others. Occasionally an apparent murder is the result of masochistic behavior, wherefore the death may be an accident.

4.3 CRIME SCENE--AUTO. See paragraph 1.11. Attention should be given to the possible presence or absence of instruments or devices in the automobile. These should be carefully handled so as not to dislodge any debris. They should be properly marked for identification, properly preserved and sent to the Laboratory.

4.4 CRIME SCENE--OTHER. See paragraph 1.16. Particular attention should be given to the presence or absence of small branches which may have been used as a whip and which may be stained. See also paragraph 4.3.

Bestiality

5.1 MEDICAL EXAMINATION. See paragraph 1.1, sub-sections (b), (c), and (f). Where intercourse has been had with a small animal or fowl, a complete description of the nature of the injuries suffered by the animal should be given.

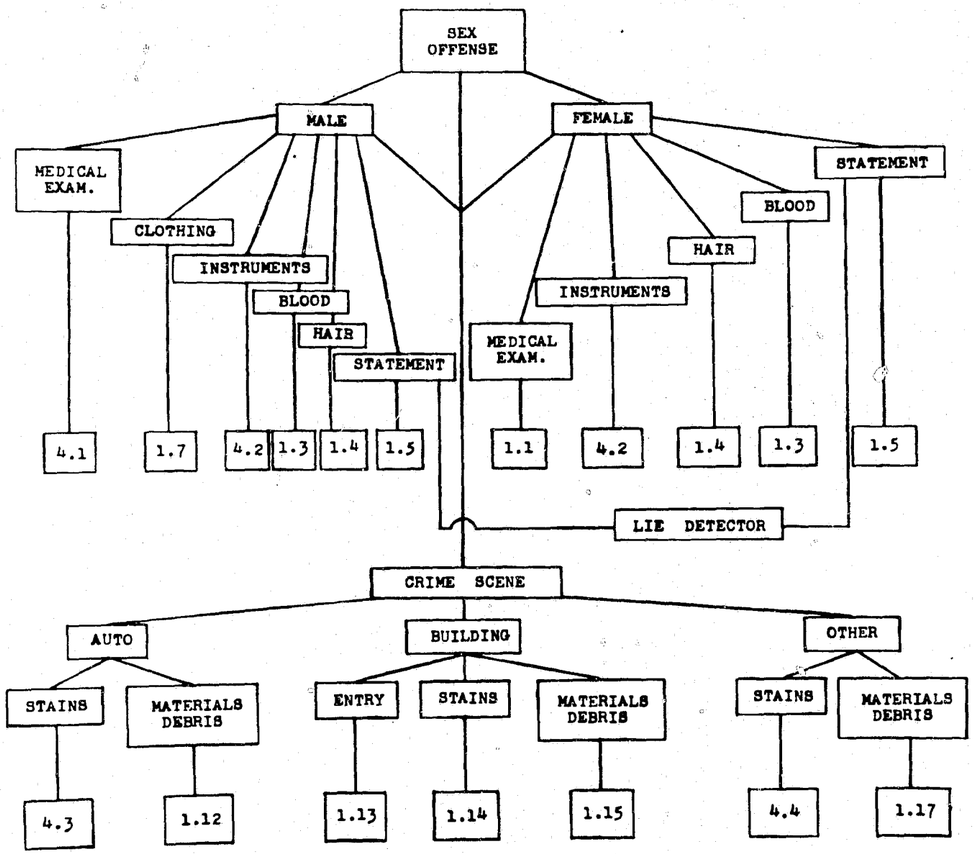
5.2 HAIRS, FEATHERS. A sample of the representative hairs should be taken from the victim animal. Those of particular interest are those about the vaginal area. At least two dozen hairs of each color and general size is considered a representative sample. These hairs should be pulled out by the roots. A feather sample, comprised of at least two dozen feathers of each type present, should be submitted for comparison purposes when the victim is a fowl. Human pubic hair may be found adhering to the animal or bird.

5.3 BLOOD. For purposes of comparison, at least 10 c.c. of whole blood should be drawn from the animal or bird and an anticoagulant (30 mg.) added. See section above "Collection, Labeling, Etc. of Physical Evidence" and Fig.5.

5.4 BLOOD. See paragraphs 1.8 and 1.3, if applicable.

Fig. 27 INVESTIGATION OF SEX OFFENSES 4.0

SADISM
MASOCHISM



Source: Wisconsin State Crime Laboratory

5.5 CRIME SCENE--BUILDING. Stains, either blood or seminal, may be present on the animal or on objects present near the area in which the offense took place. Particular attention should be directed toward the presence or absence of rags, handkerchiefs, paper tissues, or other materials or objects upon which the perpetrator may have wiped himself.

5.6 CRIME SCENE--BUILDING. The type of sex offense being considered may well be committed in a shed or barn. Materials and debris may be present in this instance in the form of human and/or animal hairs, footprints, fingerprints, leaves, rocks, soil, discarded paper, rags, cleansing tissue, and the like. Standard samples of soil, debris from floor near where act is suspected to have taken place, and manure should be submitted for comparison purposes where applicable. See also paragraph 1.15.

5.7 CRIME SCENE--OTHER. See paragraph 1.17. Particular attention should be directed toward the presence or absence of footprints, human and/or animal.

Necrophilia

6.1 MEDICAL EXAMINATION. See paragraph 1.1. In some instances, blood from the victim may be observed; tears and lacerations of the skin may be noted.

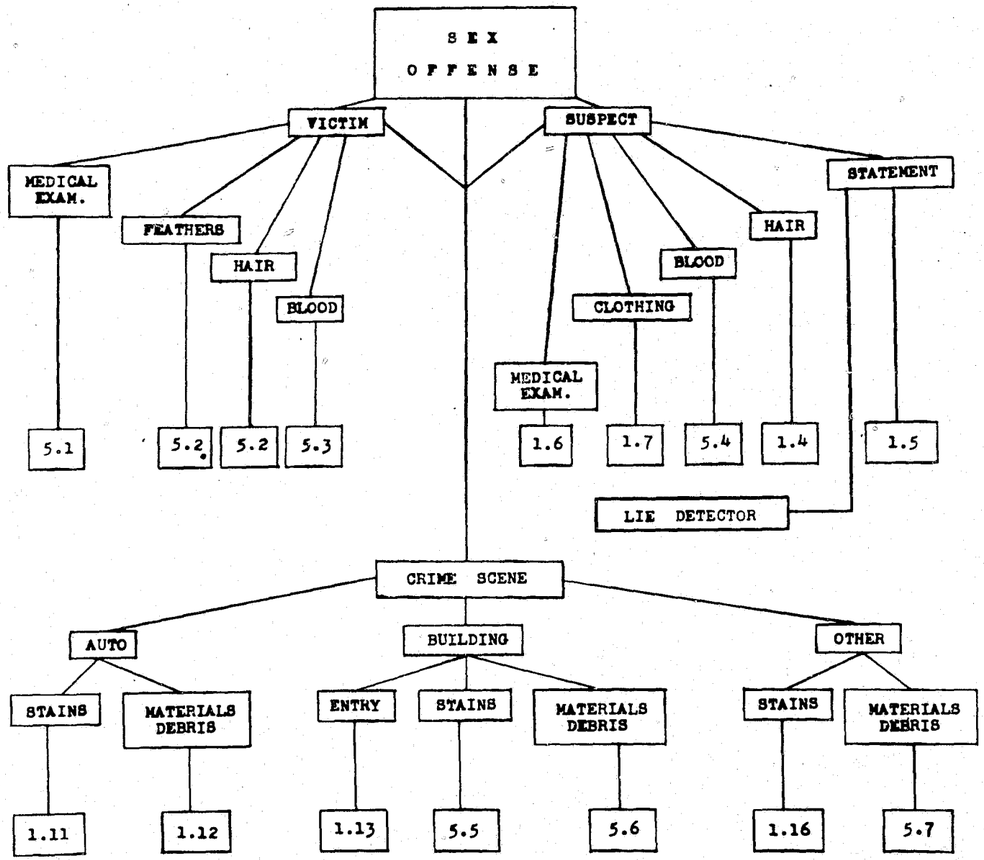
6.2 BLOOD. A blood sample must be submitted where lacerations occur. This may be adulterated with embalming fluid. A sample of the embalming fluid should be submitted for comparison, if applicable.

6.3 MEDICAL EXAMINATION. See paragraphs 1.1 and 1.6, all applicable sections.

6.4 CLOTHING. In removing the clothing from the suspect, particular care must be taken to prevent dislodging any soil or other debris that may be adhering to it. The suspect should be made to stand on a clean sheet of paper as he removes his garments and this paper submitted with the clothing. Also see paragraph 1.7.

6.5 CRIME SCENE--GRAVE-ENTRY. Where a grave has been opened in order for the perpetrator to obtain a body for his act, the method of entry is of prime importance from an evidentiary standpoint. All tools such as spades, shovels, crowbars, pick, or any other used for digging should be recovered and preserved. Any tools that may have been used for the purpose of breaking open the casket -- which may be the same as above or, in addition, hammer, chisel, axe, pinch bar, and the like -- should also be preserved, properly marked, and submitted for examination. Where the tools have been removed from the scene of the offense and are traceable to the suspect, they should be handled as little and as carefully as possible to prevent dis-

Fig. 28 INVESTIGATION OF SEX OFFENSES 5.0 BESTIALITY



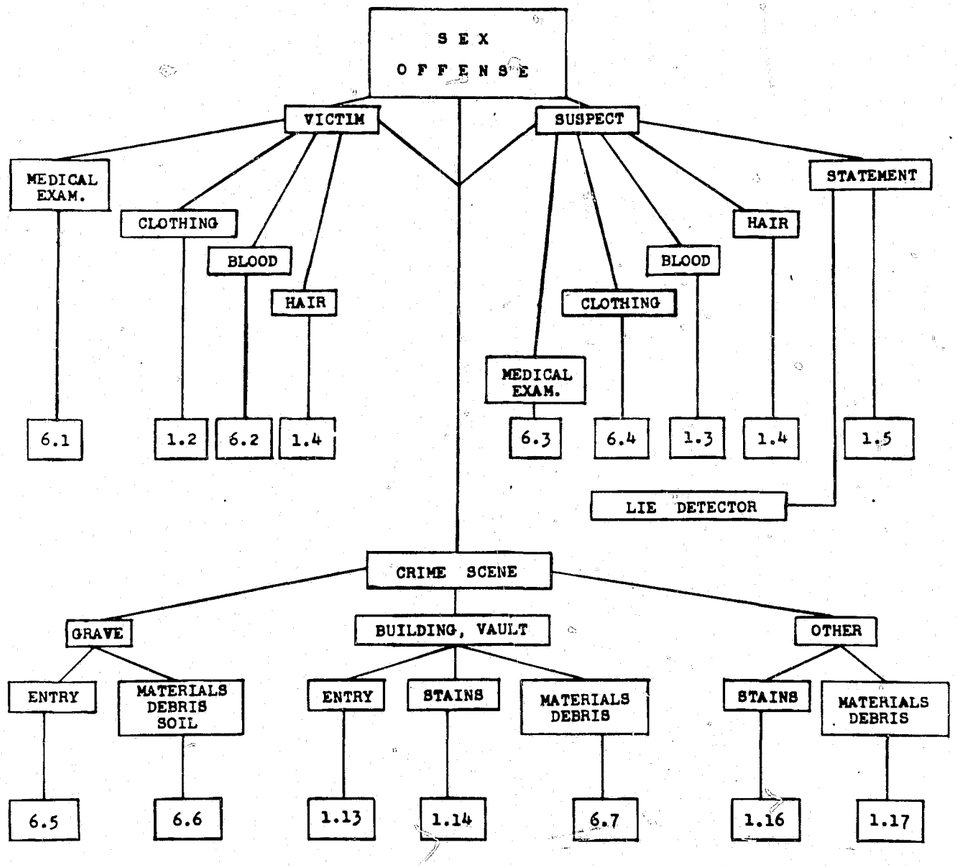
Source: Wisconsin State Crime Laboratory

lodging any soil or debris that may have evidentiary value when compared with standard materials from the crime scene. The damaged areas of the casket should be carefully removed, so as not to distort or damage the tool marks that may be present, and then submitted to the Laboratory for examination. See above section "Collection, Labeling, Etc. of Physical Evidence."

6.6 CRIME SCENE--GRAVE--MATERIALS, DEBRIS, SOIL. The perpetrator may leave at the scene some personal effect, such as a handkerchief, comb, button, or article of clothing. He most likely will have taken from the scene soil, grass, or leaves and may have debris in his clothing from the damaged casket. It is suggested, therefore, that samples of the soil, grass, leaves, paint or gilding from the casket and wood or metal from the casket be properly recovered, properly preserved, properly labeled, and submitted to the Laboratory for comparison purposes.

6.7 CRIME SCENE--BUILDING, VAULT. Debris or foreign material of any sort should be given special attention as possibly having been brought to the scene by the perpetrator or being examples of material taken from the scene by the criminal. This may include clothing fibers, fabric, buttons, clothing fasteners, blood staining, soil, clothing, personal effects, debris from the damaged vault, and so on. One should also be alert for the possible presence of footprints and tire impressions leading to or away from the area of the commission of the offense.

Fig. 29 INVESTIGATION OF SEX OFFENSES 6.0 NECROPHILIA



Source: Wisconsin State Crime Laboratory

THE INVESTIGATION OF GUN SHOT OR FIREARMS CASES

In investigations growing out of the discharge of firearms which result in an assault, an intimidation, a suicide, or murder, the victim, all firearms and related physical evidence will be of the utmost importance in any subsequent criminal action.

Any of the above situations specifically enumerated, or all together, with the possible exception of suicide, may be incidental to the compounding and/or commission of other crimes.

Upon Arrival at the Scene

The duty of the first enforcement officer or citizen at the scene, if the victim is still living, should be of course to arrange immediately for competent medical aid for the victim.

If there are witnesses to the assault present, their identity should be determined and they should be detained so that a later detailed statement may be taken. If the perpetrator is still available, he should be detained; and coincident with the detention of the perpetrator, the enforcement officer should summon aid through his superior officers. A single officer at the scene of a shooting has more responsibility than one person can reasonably be expected to assume.

The next responsibility of importance to the first officer at the scene of a shooting is to prevent all unauthorized persons from touching or otherwise disturbing or destroying any physical evidence at the scene of the crime. It has been observed that in most instances the lay person visiting the crime scene contributes very little or anything of value -- if such lay persons proceeded to the scene of a crime, shooting, or a homicide with the sole purpose of destroying physical evidence, they could not do a more perfect job than is being done on almost a daily basis. This, unfortunately, in some isolated instances, also applies to some unthinking or uninformed enforcement personnel as well.

As soon as medical aid has been requested for the victim and the assailant and any witnesses, if available, have been detained, the next important consideration of the first officer at the scene should be to preserve intact the scene of the shooting. At this early stage of an investigation, the relative weight which should be properly attached to any or all of the physical evidence at the scene cannot be properly made. As a practical matter the full significance of much of the physical evidence at the scene often is not fully appreciated until some time later either during the preparation for a criminal trial or, still later, in perfecting an appeal during

retrial. In view of these possibilities, any and all physical evidence should be properly preserved on the assumption that each item may be a crucial one for the establishment of facts and proof of guilt, or innocence.

If the victim is still conscious, the officer at the scene should attempt, if at all practicable or possible, to ascertain from the victim: (1) the identity of the assailant, or as complete a description of the assailant as possible; (2) the motive or reason for the shooting, whether the shooting was an accident, assault, robbery, or suicide; and (3) the details and circumstances preceding or connected with the injuring shot or shots.

Ordinarily, a police officer at this stage of the investigation may not be in a position to take a dying declaration, but this possibility should always be considered if it appears that the victim may die and is still conscious, rational, and able and willing to make a statement. If the victim has been advised and believes he may die and is therefore willing to make a statement, it can be taken as a dying declaration. Under these conditions it is advisable whenever possible to have at least one or two other witnesses.

Examining the Scene and Preparing Evidentiary Material

Returning to the scene of the shooting: a careful examination should be made of the scene for the purpose of ascertaining what physical evidence may be there and which of the items of physical evidence at the scene should be seized and properly preserved. The first officer arriving at the scene for this purpose should consider his notebook and his memory to be his most valuable aids to the normal powers of perception and observation. He may be called upon at some considerable time later to reconstruct from the witness stand the details of what he observed at the scene of the shooting and the physical evidence contained therein. It is suggested that the enforcement officer proceed in an orderly manner to consider the scene of the shooting as follows:

It is suggested that the investigating officer should cultivate orderly habits so that he proceeds to visually consider the locale or scene of interest or crime. If such orderly habits are developed, they will be of inestimable value not only to the investigator who acquires them but to his department as well.

It is suggested in this connection that each investigator attempt to develop the habit of proceeding in his approach to a crime scene or the locale of the investigation in the following manner. To search a room, start at the door of entry and proceed progressively in a clockwise direction observing and visually considering the areas of interest, articles of furniture, unusual objects, or conditions visible in the room. Continue circling the room until you have

examined it completely, Each time a circle is completed you move your area of focus closer to the center of the room, thereby creating a spiral effect. This method pays handsome dividends in terms of the thoroughness with which an officer proceeds in his investigations.

It is suggested the first approach be limited to a visual examination. Notes should then be made recording any unusual conditions or objects observed.

Nothing should be touched or disturbed.

Next, objects of particular interest should be considered. The possibility of the existence of latent fingerprints on weapons, telephone, door knobs, etc., should never be disregarded.

Without distubing the victim, observe and note the condition of the victim. In particular determine the location, number, and sequence of gun shot wounds, and whether or not he is able to speak coherently. If there is observed on the victim's skin or clothing any evidence or discoloration of powder burns or residues, these should be carefully noted as to the location, extent, shape, and approximate dimensions. These observations should be made without disturbing the victim's body and should be noted by the investigating officer both in his memory and in his notebook.

Observations of powder residues or darkening of the clothing or skin should be supplemented by scaled photographs, using scales similar to those included in this manual. (Fig. 22.) Such scaled photograph negatives should later be made available to the Laboratory together with the particular scale used so that a 1:1 enlargement may be prepared for laboratory examination and study.

If a weapon is recovered at the scene, the preservation of possible latent fingerprints at this state of the investigation should be of primeimportance and should never be disregarded.

If fired artridge cases are observed near the victim's body or at the scene, they should not be disturbed until notes and accurate measurements have been made in relation to fixed objects. Later on these are the basis of carefully prepared diagrams. This is in the event that autoloading or automatic weapons are involved. These weapons at the time of firing expel the fired cartridge cases in a consistent manner providing information of value as to the relative positions of assailant and victim at the time shots from weapons of this type are fired. See Fig. 30.

Information just mentioned in connection with ejection diagrams is invaluable at a later time in reconstructing the relative position of the assailant in relation to the position of the victim's body or

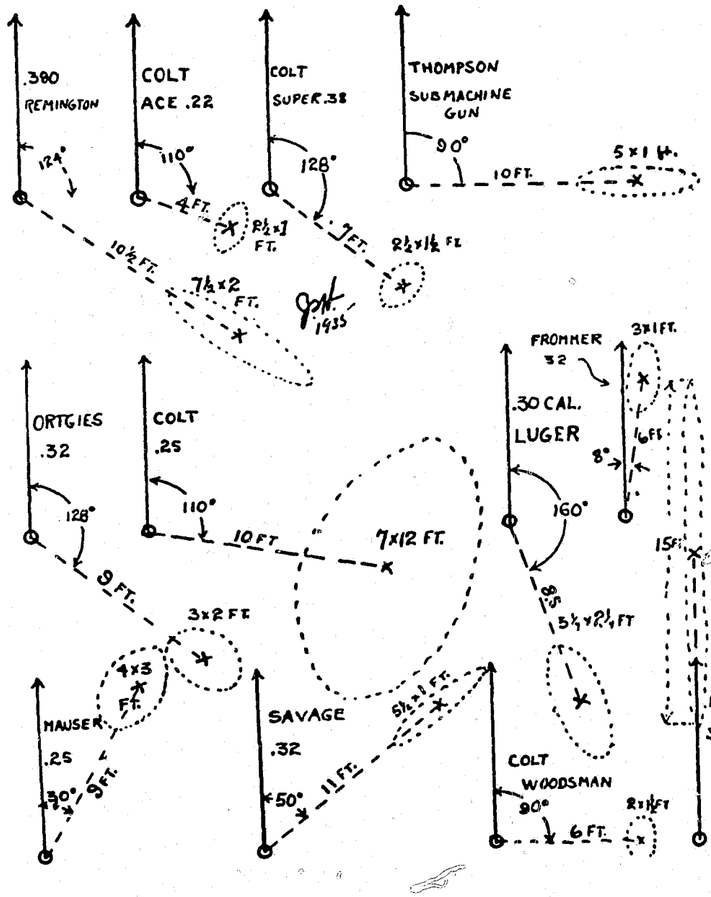


Fig. 30 EJECTION DIAGRAMS

Location of ejected shells when fired in some of the common types of automatic weapons. The arrow indicates the direction the gun was aimed at the time it was fired. The dotted circle shows the size and position of the area in which the ejected shells will fall. When shells fired from an automatic weapon are found at the scene of a shotting, it is possible to establish with fair accuracy the position in which the gun was held at the time the gun was discharged. This diagram originally appeared in Brigadier General J. S. Hatcher's excellent treatise TEXTBOOK OF FIREARMS INVESTIGATION, IDENTIFICATION AND EVIDENCE. Permission for this reproduction was obtained from Brigadier General J. S. Hatcher and Thomas G. Samworth, Publisher.

Source: Wisconsin State Crime Laboratory

of any shots fired, providing that the relative positions of the victim and any undisturbed fired cartridge cases are accurately recorded by relating them to some fixed object such as a door, window, et.

The officer in examining the scene of the shooting should carefully search or examine the doors, wall surfaces, ceiling, floor, windows, screens, bedding materials, pillows, etc. to ascertain whether or not any fired bullets have entered the surfaces of such objects. Bullets embedded in objects at the scene often are the result of wild shots, or "misses" and in some instances are shots that passed through either the victim's clothing or portions of his body. In the latter case it has been possible by testing several bullets to identify the particular bullet which passed through the victim's body. (In one case in which the victim died as the result of a through-and-through bullet penetration, several fired bullets, fired from different guns, were recovered from the walls of the murder room. However, it was found that only one of the recovered bullets contained evidence of human blood, and this blood was the same type of blood as the victim's.)

When removing bullets from walls, ceilings, floors, furniture, etc. great care should be taken so that the surface of fired bullets will not be mutilated or altered in any way in the process of removal. Particular care should be exercised in this regard if tools have to be used. It is suggested the Laboratory's assistance be sought whenever difficulty is encountered in recovery of such fired bullets.

If there is reason to believe that either fired cartridge cases or fired bullets exist at the scene of the shooting, every reasonable effort should be made to recover these exhibits as soon as possible. If any fired bullets or fired cartridge cases are recovered, they should be marked in the proper manner for purposes of identification as indicated in the charts, Figs. 11, 12 and 13.

As is recommended in the Figs. 11, 12 and 13, an "X" should not be used as a means of marking for identification. If more than one bullet or shell is recovered, it is suggested that they be numbered in sequence carrying the last initial of the officer recovering them with the subscript 1, 2, 3, 4, etc., as an illustration W1, W2, W3, W4. In the officer's notebook accurate information should be recorded as to the date, time, and the specific location from which such firearms exhibits were recovered. This information should be made available to the district attorney and to the Laboratory.

In the search of the scene of a shooting: if the scene of the shooting is in a building, a careful search should be made, the purpose being to locate any firearms, loaded ammunition, or ammunition boxes which may be available in dresser drawers, closets, desks, a basement, etc. Evidence of this type (weapons and loaded ammunition)

should be immediately recovered; and after being properly marked for identification, forwarded to the Laboratory with the other evidence. Any ammunition boxes encountered should also be seized and made available to the Laboratory since such cardboard boxes are code stamped by manufacturer. This information later has proved to be of considerable value.

Loaded cartridges can be of considerable value if submitted to the Laboratory for a thorough examination.

Loaded cartridges may yield the following information which may contribute to the investigation:

1. Firing pin imprints (cartridges which have "misfired")
2. Extractor markings resulting from hand ejection of loaded cartridges which have not been fired
3. Ejector marks resulting from same cause as #2 above
4. Head stamp or bunter die imperfections, drawing, turning, or loading machine tool or die imperfections. These may permit the laboratory technician to demonstrate the two shells (fired and unfired shells or two loaded unfired cartridges) not only are of the same make, etc. but also that both were made or loaded by the same dies, thus establishing a connection between these otherwise disconnected objects.

If it will not in any way delay the removal of the victim to the hospital, photographs should be taken of the scene. In some cases it may be advisable to supplement this by taking dimensions which will permit scaled drawings to be made later. The advisability of this should not be ignored or overlooked. In the event the victim has been pronounced dead by a physician, before the victim's body is moved to the undertaking establishment or hospital for autopsy, a complete set of photographs should be made of the scene with the dead victim's body in the picture. This should be done before the body of the victim is moved or disturbed in any way. To disregard this may result in jeopardizing admission as evidence later.

If the fatal or assault weapon with ammunition of the same type as used in the shooting is made available to the Laboratory, powder patterns, and ejection patterns for a particular automatic or autoloading weapon may be prepared. Due to difference in design, each make and type of autoloading or full automatic weapon ejects fired cartridge cases with surprising consistency in the relative position the fired cases are ejected and assume in relation to the direction and shots fired from a particular weapon. There is some variation of this pattern from one gun to another, but despite this the consistency of the ejection pattern exists as suggested by Fig. 30, wherein are reproduced the ejection patterns of some of the common autoloading weapons.

In the event the victim is still living and has been removed to the hospital, it is suggested that the Superintendent of the Hospital, attending surgeons, and physician, be cautioned that in the removal of the victim's clothing, if such articles of clothing contain gunshot penetrations, powder residues, or knife penetrations, every effort should be made to remove the clothing in such a manner so as not to disturb the clothing penetrations or powder residues which may exist on the surface of the clothing. In the event the victim's clothing must be cut in order to remove it, it should be done in such a way that cuts do not extend through knife or gunshot penetrations or powder residues on the clothing.

If powder marks exist on the victim's skin, scaled photographs properly taken should be made of such powder residues. See Figure 31, A, B, C. This will, of course, have to be done with the approval of the attending physician, if the victim is still living. If the victim is dead, scaled photographs should also be made of any cuts, bruises, or powder residues before the autopsy is performed and after the skin has been sponged to remove blood.

If the victim is dead, these scaled photographs may be made either at the undertaking parlor or the hospital. If there is a visible discoloration of the victim's skin not obscured by blood, scaled photographs should be made both before and after the victim's skin is washed or sponged. The victim's clothing should be removed with the minimum amount of cutting of the clothing (the instructions given above should be followed) and each separate type of clothing should be placed in a separate, clean paper bag after being removed and properly marked for identification by an officer and then forwarded to the Laboratory for laboratory processing. The removal, marking for identification, and packing operations should be carried on with a minimum of disturbance of the fabric. See Figures 9, 10 and 11.

If the clothing is blood soaked or encrusted, each article should be hung up separately and air dried and when dry, each type of clothing, as suggested, should be placed in separate, clean paper bags (see Figures 9 and 10) and sent to the Laboratory for examination and study.

Clothing suspected of containing powder particles of metal or products of combustion of powder in cases where it is thought gunshot wounds have been discharged at close range. may be examined in the Laboratory by one of the following means:

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

1. Visual or microscopic examination

2. Photographic means

3. Chemical means

4. Soft X-Ray (See Figures 31D and 32D)

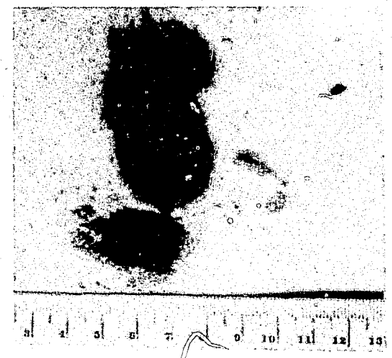
If, as the result of the examinations mentioned, there is evidence firearms have been discharged at close range, and if the fatal weapon with any live ammunition of the same make, caliber and type as the fatal shot is made available to the Laboratory, tests can be undertaken to establish the approximate distance intervening between the muzzle of the fatal weapon and the victim's clothing at the time the fatal shot was fired. This determination is often of considerable value at the time of the trial and, therefore, should not be disregarded.

Under certain conditions, as the result of the studies mentioned, the precise position of the weapon can quite accurately be established as was recently accomplished in the case of State vs. Babich. See Figure 32.

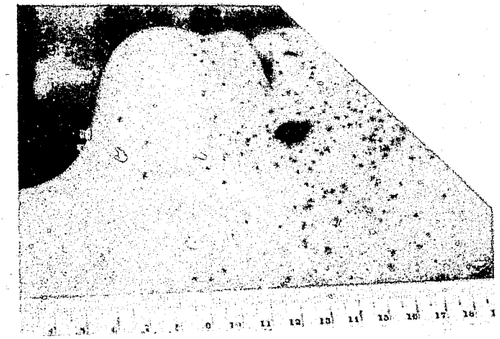
If the victim is living, one of the anatomical outlines, Figures 14, 15, 16, 17, 18 or 19, should be used by the attending physician, surgeon, or autopsy surgeon to accurately designate entrance points, exit points, and the bullet path or penetration in the victim's body. These diagrams should then be forwarded to the Laboratory with the other information and materials to be processed. Photostatic copies of these marked anatomical diagrams will be retained by the Laboratory, the original being furnished to the district attorney by the Laboratory. Such diagrams will be valuable later in the trial of any criminal matter.

In the removal of fired bullets, fired shot wads, or shot pellets from the victim's body, either if the victim is living or if he is dead, the attending surgeon or autopsy surgeon should be reminded to properly mark any foreign material of this type removed from the victim's body. The anatomical outlines included in this manual, Figures 14 to 19 inclusive, should be made available to the attending surgeon or autopsy surgeon and he be requested to indicate the outline, entrance, exit, path, and locale from which bullets, wads, or pellets were removed. In addition, the path of penetration should be indicated on the anatomical outline. The chart should then be initialed and dated by the physician and forwarded to the Laboratory. Additional copies will then be forwarded to the submitting agency to replace the original outlines originally supplied in this manual.

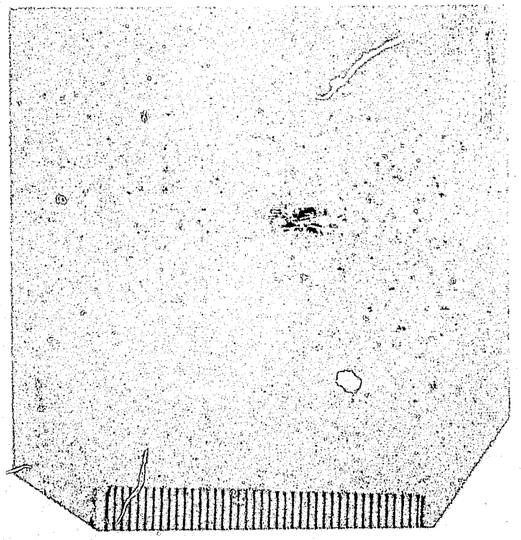
Fig. 31 DETERMINATION OF DISTANCE AT WHICH FIREARMS WERE DISCHARGED THREE SCALED PHOTOGRAPHS SUGGESTING PROPER METHOD OF TAKING SUCH SCALED PHOTOGRAPHS.



A. Scaled Photograph - Suicide
Three shotgun penetrations--breast of victim. One barrel fired singly. Both barrels fired simultaneously leaving powder smudges approximating shape of muzzle of shotgun.



B. Scaled Photograph
9 mm. automatic pistol powder pattern showing powder smudges and tatooing on face of victim surrounding fatal gunshot wound.



C. Scaled Photograph
Grease or graphite smudges from powder grains left on fabric of victim's shirtwaist making an approximation of distance at which shot was fired possible.

Source: Wisconsin State Crime Laboratory

D. Soft X-Ray Radiograph of Fabric
Revolver fired at a distance which left no powder residues on fabric. White specks are metal particles which are opaque to X-Rays. An approximation of distance was possible.

Every effort should be made by the surgeon removing foreign materials such as shot pellets, shot wads, fired bullets, fractured or broken parts of sharp instruments such as knife point, etc., from the victim's body to hold to an absolute minimum any mutilation of the surface of these objects which may be removed from the victim's body by means of a tweezers or hemostats.

In some cases, x-rays or radiographs are made in a hospital at the direction of the attending physician or surgeon where the victim is taken for care and treatment. If, in the treatment of the victim, it is considered unlikely that the surgeon will remove the bullet, pellets, etc. because of endangering the victim's life, such radiographs, together with detailed information as to type of equipment used in making the radiographs, the approximate distance from the target of the x-ray tube to the casette or x-ray film holder, the size of the focal spot of the x-ray tube used, type of radiographic film, exposure time, and x-ray tube voltage current used in making such radiographs, should be made available to the Laboratory together with the x-ray or radiographic films themselves.

X-ray fluoroscopic examinations are often made by attending physicians or surgeons to locate fired bullets, pellets, broken portions of razor or knife point or foreign materials which may be imbedded in the victim's body. If it appears unlikely because of the location of such foreign materials in the victim's body that the attending surgeon may decide not to remove them, radiographs should be taken with maximum clarity, contrast, and detail, and a minimum of distortion and foreshortening.

The radiographs should be taken with the axis of the x-ray cone of rays, or beam at right angles to the axis of the foreign object so that the most precise and accurate outline or profile of the contour of the foreign object may be ascertained with a minimum of foreshortening or distortion.

If any small particles of metal or lead are found deposited in the tissues along the path of the bullet, radiographs (both Lateral and A. P.) should be made showing with maximum clarity, contrast and detail the location, shape, and disbursement of such particles of metal or lead in relation to the position in which the bullet finally came to rest and also in relation to the entrance point of the projectile. This will be valuable in determining the direction of penetration or trajectory of the fatal shot in traversing the victim's body.

The purpose of these recommended radiographs is;first, to permit, if possible, the identification of metallic particles imbedded in the victim's body; second, to establish precisely the location, direction, or path of the penetration of the bullet or pellet in relation to the entrance point; and third, to explain the mutilation of projectiles which strike bone and also in cases in which a projectile has struck and shattered or fragmented bone, spicules

of bone will then become secondary projectiles producing multiple exit wounds in the victim's tissue and skin. If this has occurred, it is, of course, valuable in some cases in explaining multiple exit wounds where it appears there is a single projectile entrance wound. Gunshot head wounds are capable of producing fracture conditions that have been confusing to a person unfamiliar with such cases. (In cases involving wounds inflicted by projectiles having an instrumental velocity of greater than approximately 900 feet per second the shock waves have been known to cause multiple fractures of the skull. The appearance of the skull has suggested to physicians of limited experience with gunshot cases that the victim, in addition to having been shot, had been repeatedly beaten about the head.)

In rare instances, metal parts of shoes, clothes, such as zippers and buttons are struck by entering projectiles and carried into the victim's body. These may be identified if the suggested radiographs are made available to the Laboratory.

X-ray voltages and currents should be kept at a minimum in order to minimize scattering of x-rays to resolve the detail of the small particles of metal which are found to exist along the path of a projectile which has passed through bone and soft tissue.

Any firearms recovered either at the scene of the crime or recovered from the possession of any suspects or persons under investigation should be marked in the manner suggested in Fig. 11 in the manual and be forwarded to the Laboratory for examination, registration, and for purposes of firing and filing test bullets and shells. If the weapons contain loaded cartridges or clips containing loaded cartridges, these loaded cartridges, themselves, should be properly marked for identification, particular attention being paid to the diagrams contained in Figs. 12 and 13.

Care should be exercised with confiscated or recovered rifles, machine guns, or automatic pistols--they may contain clips of loaded cartridges. Also, from the standpoint of safety, remember that with this type of weapon even after a clip is removed there may be a loaded cartridge still remaining in the chamber of the weapon. The possibility of the existence of fingerprints on the sides of clips or on the surface of loaded cartridges in clips should not be overlooked or disregarded. If clips are carefully removed from weapons, the outside surfaces of the clips will sometimes contain latent fingerprints, particularly thumb and index fingerprints. Loaded cartridges contained in such clips have been known to retain on their surfaces an identifiable thumb print. For this reason if clips are removed, the cartridges themselves should not be removed from the clips without checking such cartridges to ascertain if identifiable latent fingerprints are present on the sides of the cartridge cases or clip.

Weapons or metal objects from which manufacturers' stamped serial numbers have been removed can be, in most instances, restored by the Laboratory by polishing the surface where the original marks and numbers were stamped; and by the application of proper differential etching reagents, the residual stresses in the metal below the surface produced by the numbering die can be made visible and sometimes photographed.

The chamber positions from which loaded cartridges were removed in the case of revolvers should also be indicated by marking the outer portions of the cylinder as suggested in Diagram II, Fig. 13. These instructions are particularly applicable when fired cartridge cases are recovered in the chamber positions of a revolver cylinder. The cylinder should be oriented in relation to the chamber position under the hammer when the weapon is recovered.

As suggested in Fig. 11, no attempt should be made to actuate the mechanism, fire test shots or clean the weapon. If the suggested procedures are followed, the weapon should be made available to the Laboratory for a complete examination.

Custody of Firearms Exhibits and Ammunition

When firearms, ammunition, fired bullets, or shells are submitted to the Laboratory for examination, it is recommended that such exhibits remain in the custody of the Laboratory until the time of trial.

Routine procedures in the Laboratory are to make a permanent record, including serial numbers, of any weapon which is submitted, and to test fired bullets and shells from such weapons, the test bullets and shells being retained permanently in our files.

Fired bullets or shells, which are submitted, such as fatal or assault exhibits in unsolved cases will remain permanently in our files until they are needed or requested either by the submitting agency or the district attorney. These bullets and shells, as well as test bullets and shells, are cross compared with other similar exhibits and, if identification is made, the two submitting agencies are immediately advised.

Such information as can be gathered from an examination of fired bullets or shells is placed in a special file recording all other similar cases. A constant cross check will be made comparing such fired bullets and shells submitted and also comparing test bullets and shells abandoned, found or confiscated from weapons suspected of having been used in the commission of crimes or recovered under suspicious circumstances. In the card file of fatal exhibits and suspected weapons referred to, the individual exhibits are indexed according to class characteristics of the weapon from which such fatal exhibits were fired. This, it is anticipated, will be a constant source of valuable information enabling the Laboratory in

some instances to advise later the two submitting agencies that either the same weapon was used in firing both fatal bullets or fired shells or that two fatal bullets or shells on file were fired from a particular weapon submitted for examination. Such findings and aids to enforcement agencies are possible from the markings remaining on either fired bullets or shells and when made will be valuable information not otherwise available to the submitting enforcement agencies.

The Laboratory, in order to serve better the enforcement structure of the state, maintains an extensive reference collection of ammunition and weapons of all types. This collection is important in that it supplies factual information as to mechanisms, serial and lot numbers, proof marks, safety devices and their possible malfunction, class characteristics evident on either shells or bullets.

We are constantly seeking to supplement this reference collection of rifles, shotguns, machine guns, handguns and fixed metallic ammunition of all calibers and types, both foreign and American, modern and ancient.

In order to help the Laboratory attain the objectives stated above, both the Wisconsin Chiefs of Police Association and the Wisconsin Sheriffs and Deputy Sheriffs Association have unanimously passed similar resolutions which are quoted herein.

Firearms Exhibits Resolutions Passed by
Wisconsin Chiefs of Police Association
and Wisconsin Sheriffs and Deputy Sheriffs
Association.

The following resolutions were adopted at meetings of the two enforcement agency associations shown above and indicate the consensus of the members as to the proper handling and disposition of firearms exhibits encountered in investigations:

RESOLUTION UNANIMOUSLY ADOPTED AT THE ANNUAL CONVENTION OF THE WISCONSIN CHIEFS OF POLICE ASSOCIATION, MILWAUKEE, WISCONSIN.

"It is desired that the Superintendent of the State Crime Laboratory work out details so that fired bullets and shells recovered in the course of investigation of criminal cases will be received by the Laboratory, inter-compared, and reports forwarded to the Chief of Police and District Attorney relative to laboratory findings; and

Also in all cases where weapons are recovered which are suspected of having been used in the commission of crime will be sent to the Laboratory and test bullets fired from them and a registration maintained at the Laboratory concerning all such weapons; and

It is further suggested that bullets and shells submitted be permanently retained at the Laboratory until such time as they may be needed in criminal proceedings when they will be made available to the court hearing such criminal proceedings where the exhibit may be required. At the completion of the criminal proceedings we suggest that they be returned to the Laboratory and permanently retained there, now, therefore be it

That the Wisconsin Chiefs of Police Association go on record favoring this procedure."

RESOLUTION ADOPTED AT SHERIFFS ASSOCIATION ANNUAL MEETING.

"It is requested that the Superintendent of the State Crime Laboratory work out details so that fired bullets and shells recovered in the course of investigation of criminal cases will be received by the laboratory, inter-compared, and reports forwarded to the sheriff and district attorney relative to laboratory findings. Also in all cases where weapons are recovered which are suspected of having been used in the commission of crime will be received by the Laboratory and test bullets fired from them and a registration maintained at the Laboratory concerning all such weapons. We further suggest that bullets and shells submitted be permanently retained at the Laboratory until such time as they may be needed in criminal proceedings when they will be made available to the court hearing such criminal proceedings where the exhibits may be required. At the completion of the criminal proceedings we suggest that they be returned to the Laboratory and permanently retained there."

Disposition of Firearms and Firearms Evidence

At the request of the Laboratory, Mr. William A. Platz of the Attorney General's office has prepared for the convenience and use of the district attorneys two suggested forms to be used as notices of motion for disposition of evidence and an order disposing of evidence as provided under Wisconsin Statutes, 363.04.

For the reasons previously stated, it is requested and urged that wherever possible, disposition of firearms evidence be in accordance with section 363.04 quoted below:

> Property seized under a search warrant or validly seized without a warrant shall be safely kept by the officer (who may leave it in the custody of the sheriff, taking a receipt therefor) so long as necessary for the purpose of being produced as evidence in any trial. As soon as may be thereafter it shall be disposed of as follows, under the order of the court:

(5) Contraband. Articles of contraband shall be destroyed. This includes without limitation gambling devices, lottery tickets, obscene or otherwise illegal literature, counterfeit, forged or spurious money, coin or written instruments and the tools, dies, machines or materials for making them, and narcotic drugs and the implements for smoking them. But if any such articles shall be capable of innocent use, the court may in its discretion order the same to be sold and the proceeds paid over to the county treasurer who shall account for and pay them over to the state treasurer pursuant to section 59.20 (5) for the use of the school fund. Narcotic drugs may be so sold only to a person legally entitled to possess them.

(8) Firearms, Explosives, etc. Firearms, ammunition, explosives, bombs, infernal machines, and like devices, which have been used in the commission of crimes, shall be shipped to and become the property of the state crime laboratory. Articles mentioned in subsection (5) shall be turned over to said laboratory at the request of the superintendent, in lieu of destruction. The superintendent may, in his discretion, destroy any such material for which the laboratory has no use.

1. Recommended Form: NOTICE FOR DISPOSITION OF EVIDENCE

STATE OF WISCONSIN _____COURT _____COUNTY

STATE OF WISCONSIN,

Plaintiff,

v.

_____,Defendant.

NOTICE OF MOTION FOR DISPOSITION OF EVIDENCE

TO: _____

Attorney for Defendant.

PLEASE TAKE NOTICE, That on the ___ day of _____, A.D. 19__, the undersigned will move to said court at its courtroom in the courthouse in the city of _____, _____ county, Wisconsin, pursuant to sec. 363.04, Stats., for an order directing the disposition of property seized in connection with the above entitled case as follows:

1. That the _____ (Description of weapon), Serial No.___ (constituting Ex. A in the said action), together with the bullets (Exs. B, C, and D), exploded shells (Exs. E and F), and the unfired _____ (ammunition) (Exs. G through M), shall be shipped to and become the property of the state crime laboratory;

2. That the following articles of contraband shall, upon the request of the superintendent of the state crime laboratory, a copy of which is hereto attached, be turned over to said laboratory in lieu of destruction:

(Here list articles of contraband, giving exhibit numbers, if any.)

Dated at _____, Wisconsin, this ___ day of _____, A.D. 19__.

JOHN DOE
District Attorney

2. Recommended Form: NOTICE FOR DISPOSITION OF EVIDENCE

STATE OF WISCONSIN _____COURT _____COUNTY

STATE OF WISCONSIN,

Plaintiff,

v.

_____Defendant.

ORDER DISPOSING OF EVIDENCE

The motion of John Doe, district attorney, for an order for the disposition of certain evidence, having come on for argument before the court on the ____day of _____, A.D. 19___, the said John Doe, district attorney, having appeared for the state and the defendant having appeared by _____, his attorney, and the court having heard the arguments of counsel and being fully advised in the premises, now therefore it is

ORDERED:

1. That the _____ (Description of Weapon), Serial No. _____ (constituting Ex. A. in the said action), together with the bullets (Exs. B, C, and D), exploded shells (Exs. E and F), and the unfired _____ (ammunition) (Exs. G through M), shall be shipped to and become the property of the state crime laboratory:

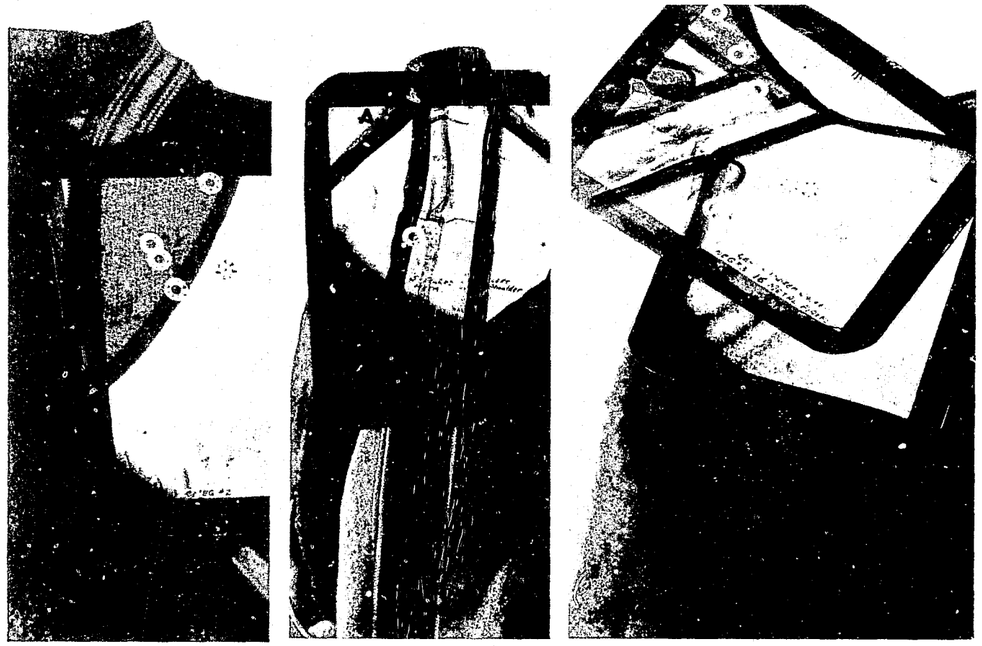
2. That the following articles of contraband shall be turned over to said laboratory in lieu of destruction:

(Here list articles of contraband, giving Exhibit numbers, if any.)

Dated at _____, Wisconsin, this _____day of _____, A.D. 19___.

BY THE COURT:
_____ Judge

Fig. 32 SOFT X-RAYS (RADIOGRAPHS) USED IN 258 WIS. 290, 45 NW 2D660

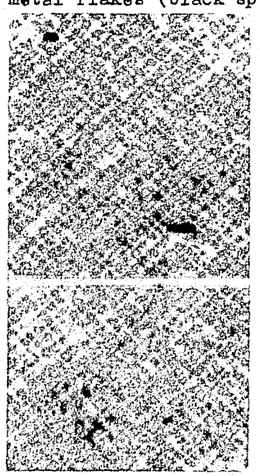


A. Left front of jacket worn by victim.

B. Left shoulder of jacket worn by victim.

C. Left back shoulder of jacket worn by victim.

D. and E. Enlarged photographs of some of the metal flakes (black spots) found in jacket fabric.



Victim was shot twice. Shot No. 1 went through jaw and neck. Shot No. 2 entered head behind the left ear causing instant death. Fatal weapon was a 22 cal. 6" barrel target revolver. Powder residues behind left ear established that muzzle was 6" to 8" from the victim's head when fired. In photographs A, B, and C, contact paper prints of soft x-rays (radiographs) were made of the jacket and have been pinned to the jacket in correct positions. White gummed enforcing circles localize areas where metal flakes were found imbedded in jacket fabric. These metal flakes were blown from gap at front end of cylinder of revolver at time of firing. Soft x-rays were used in establishing the presence of microscopic metal flakes (black spots in D and E). This evidence was in conflict with statement of defendant that shots were fired during struggle with victim for possession of weapon. Metal flakes on the back of the left shoulder makes victim's contact with weapon an anatomical impossibility.

Source: Wisconsin State Crime Laboratory

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Fig. 33 POSSIBLE LABORATORY DETERMINATIONS ADMISSIBLE AS EVIDENCE

EXHIBIT	POSSIBLE LABORATORY DETERMINATION	REQUIRED BY LABORATORY
A FIRED BULLET	Make, Caliber, Type of Firearms from which each could have been discharged; type of propellant used, in firing; name of maker and maker's designation as to type, caliber, etc.	Fired bullets.
B FIRED CARTRIDGE CASE	Make, Caliber, Type of Firearm in which each could have been fired; type of propellant used in firing; name of maker and maker's designation as to type, caliber, etc.	Fired cartridge case.
C TWO OR MORE FIRED BULLETS	In addition to **A**, whether two or all were fired from the same firearm.	Two or all fired bullets.
D TWO OR MORE FIRED CARTRIDGE CASES	In addition to **B**, whether two or all were fired from the same firearm.	Two or all fired cartridge cases.
E FIRED BULLET AND SUSPECTED FIREARM	In addition to **A** above, whether bullet was fired from suspected firearm.	Suspected firearm and fired bullet. See Note 2.
F FIRED CARTRIDGE CASE AND SUSPECTED FIREARM	In addition to **B** above, whether cartridge case was fired in suspected firearm.	Suspected firearm and fired cartridge cases. See Note 2.
G A FIREARM, AMMUNITION, AND A SCALED PHOTOGRAPH OF POWDER OR SHOT PATTERN	Approximate distance at which shot was discharged.	Scaled Photographs. See Note 2.
H SHOT PELLETS AND WADS	Size of shot, and gauge designation of arm firing wads.	Shot pellets and/or shot wads.

1. Fired bullets, fired cartridge cases or fired shot shells and suspected firearm and any ammunition, together with manufacturers' boxes, if recovered in investigation should be inventoried. These should be submitted to the Laboratory after clearance with District Attorney's office and with superior officer.
2. Consult the Laboratory concerning the making of scaled photographs of powder patterns on victim's skin, doors, walls, etc. If clothing is suspected of containing powder residues they can be wrapped in clean paper or placed in a clean paper bag and preserved. They should be handled as little as possible.

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

COMPARATIVE MICROGRAPHY

Comparative micrography may be defined as the application of visual, optical or photographic methods of comparing surface details, objects, or articles which have been deformed as the result of one solid object coming either violently or under the action of pressure in contact with a solid second object.

In a broad sense, the modern laboratory applications of these methods of demonstrating the similarity of such transfers of class and individual characteristics to the surfaces of fired bullets and shells fired in a particular weapon might be considered as a specific example of comparative micrography applied in the field of firearms identification.

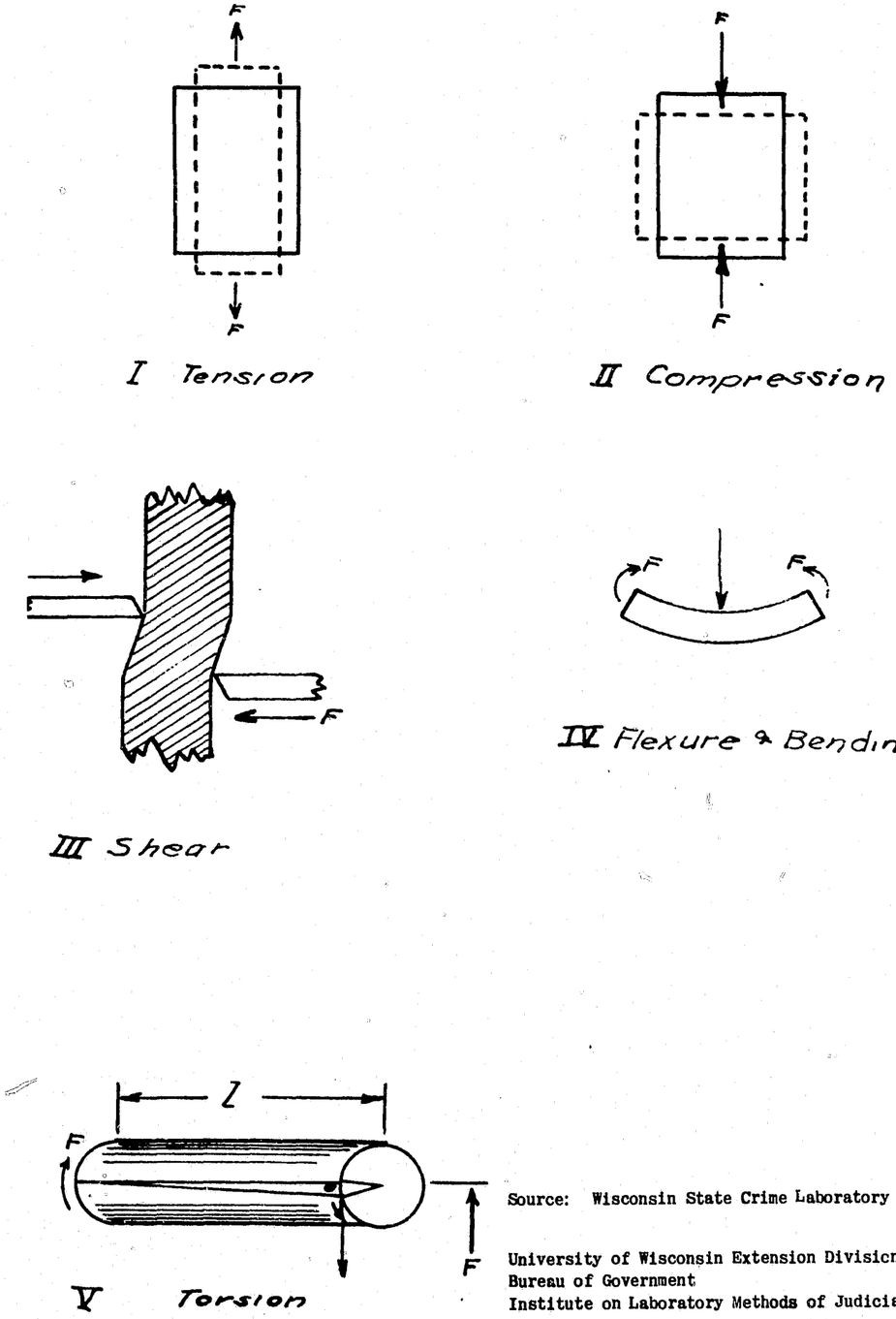
The application of comparative micrography methods in the field of criminal investigations is not new. It involves in part the comparison of individual characteristics found to be present on the door of a safe or on the surface of a wooden door or door jamb which has been forced by means of a pry bar, crow bar, and cutting tools. In these cases of forced entry, technically speaking, the elastic limit of the material deformed was exceeded so that the surfaces of the two objects were permanently deformed. Under these conditions, if there are individual characteristics present on the surface of the cutting tool or the pry bar, we would expect the reverse impression of these characteristics to be transferred to the surface of the object.

The applications of comparative micrography have been applied to a great many types of evidence in criminal investigations. Wire nails, machined surfaces, hammer marks, rod or bolt cutters, saws, metal (twist) drills, parts of bombs or infernal machines have been successfully compared to demonstrate that the deformations of the surfaces of two objects formed or cut was accomplished with the same tool. It is impossible to reproduce artificially the distinctive individual characteristics found to be present on the surfaces of cutting, turning, or forming tools.

In considering the possibility as to whether or not materials in an investigation are suitable for examination by the Laboratory, it is well to commence with a description of the ways in which solids can be deformed.

From a mechanical standpoint, solid materials are deformed in one of the five ways that are illustrated Fig. 34. Solid materials to be considered here are as follows: metals, plastics, wood, etc. Permanent deformation of these materials may be accomplished by the application of a mechanical force in one of the five ways illustrated, this force being of such magnitude as to produce a permanent deformation of the original object. This deformation invariably indicates how the force was applied. If the deforming object is

Fig. 34 MEANS OF DEFORMING SOLIDS



Source: Wisconsin State Crime Laboratory

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

harder than the object deformed, the nature, size, shape, and also the reverse impressions of microscopic surface defects will be transferred to the surface of the softer object deformed.

In the first case, No. I, Fig. 34 that of tension: the deformation of metals, certain types of plastics, wood, and other solid materials which have opposing forces applied to them to the extent that a permanent deformation or possibly a fracture occurs, the evidence of how these forces were applied will remain on the original object until the deformed object is itself again changed. The same is true in the case of compression, case No. II. In this case the forces applied to an object produce in combination the resultant permanent deformation of the original object in the form of compression. Evidence of this type of deformation remains until the original object is altered in some way. In the case of shear, case No. III, the distortion and shearing of the surface of the original object by the application of opposing forces through the media of the sharp edges of the cutting tool will leave conclusive evidence as to the form and shape of the deforming blades. Usually in such situations the reverse impression of any accidental or individual characteristics existing on the shearing blades will be left on the surfaces of the original sheared objects.

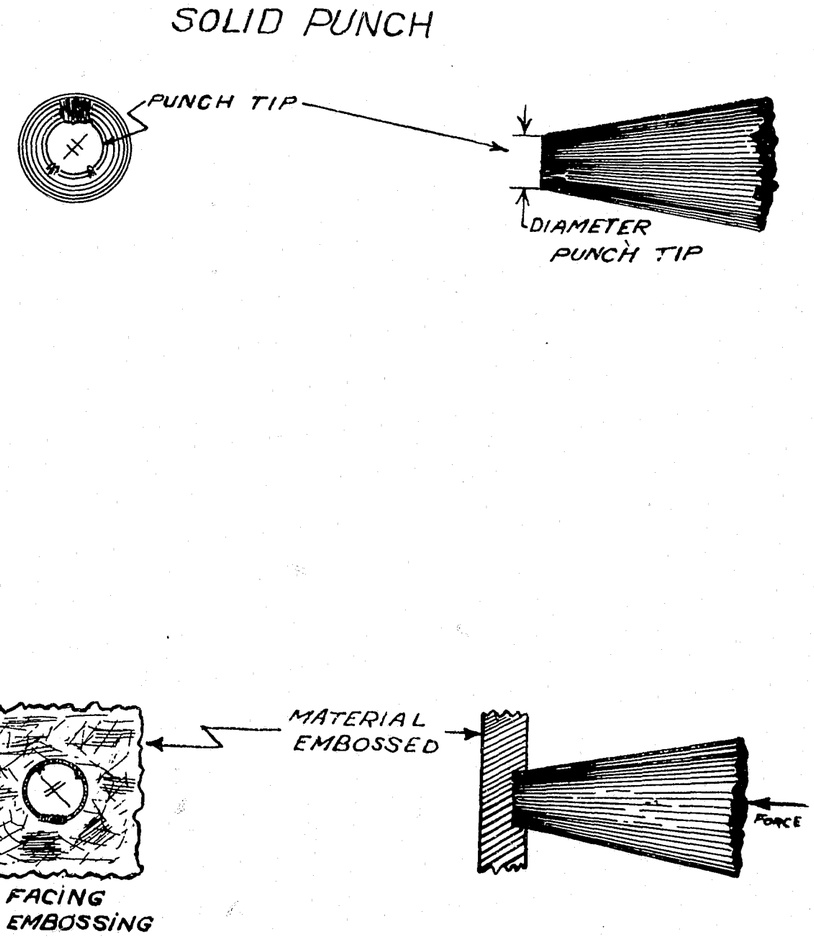
In cases where flexing or bending, Case IV, Fig. 34, produces a permanent deformation of the original object, the way in which the forces were applied to the deformed object is clearly demonstrated by a careful examination of the deformed or bent object. The same is true in the case of torsion where the twisting force is applied around the axis of the original bar as illustrated in Case V, Fig. 34.

Where there has been a permanent deformation of an object by the application of a force, to a solid object, the magnitude of which exceeds the elastic limit of a solid object which is so deformed the nature of the deforming force and object will be indicated by the dimensions, shape, and extent of the localized force applied to the deformed object. If the deforming object possesses individual characteristics which are peculiar to this particular object and to no other, we would likewise expect the reversed impression of these characteristics to be transferred to the surfaces of two or more objects deformed in succession by the same tool. For example, in the case of the use of a solid steel punch used to punch a combination safe, the reverse characteristics at the tip of the deforming punch would be left on the surface of the safe which was punched. This is illustrated in Fig. 35. In addition to class characteristics such as the diameter and shape of the tip of the punch being left on the surface of the punched safe, the reverse impression of individual characteristics would also be found to have been transferred to the surface of the parts of the safe so deformed, as is illustrated in Fig. 35, "A" and "C".

The comparative micrography laboratory technician supplied with the deformed parts of buildings, safes, doors, windows, etc. actually

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Fig. 35 EMBOSSED MARKINGS



Source: Wisconsin State Crime Laboratory

CW
51

proceeds in an orderly manner to consider first the nature, size, shape, or contour of the deforming tool used to effect entry or to accomplish the deformation. Incidental to this study a careful examination is made as to the possibility of the existence of class characteristics, which are those characteristics that may be common to another similar tool of the same size and type. In this study the technician also investigates the possible presence or absence of individual characteristics which may be present and peculiar to one particular tool and to no other. Individual characteristics are those distinctive accidental characteristics peculiar to one particular tool and to no other.

In the case of wire or rod cutters of the type illustrated in Figs. 36, 41 and 44, the use of these tools is an example of a squeezing action which results in the permanent deformation of the objects cut and at the same time leaves the reverse impression of any class or individual characteristics of any distinctive individual characteristics which may be present in the cutting jaws such as nicks, grinding marks, etc. Rods or wires cut in succession with the same pair of cutting jaws would be expected then to leave the reverse impression of individual characteristics present on the cut ends which are suitable for study, comparison, and identification. The same is true of cold chisels, screwdrivers, pry bars, metal or twist drills, hammers, sledge hammers, picks, mattocks, carpenters' bars, crow bars, ripping bars, metal saw blades, etc. as listed in Figs. 41, 42 and 43.

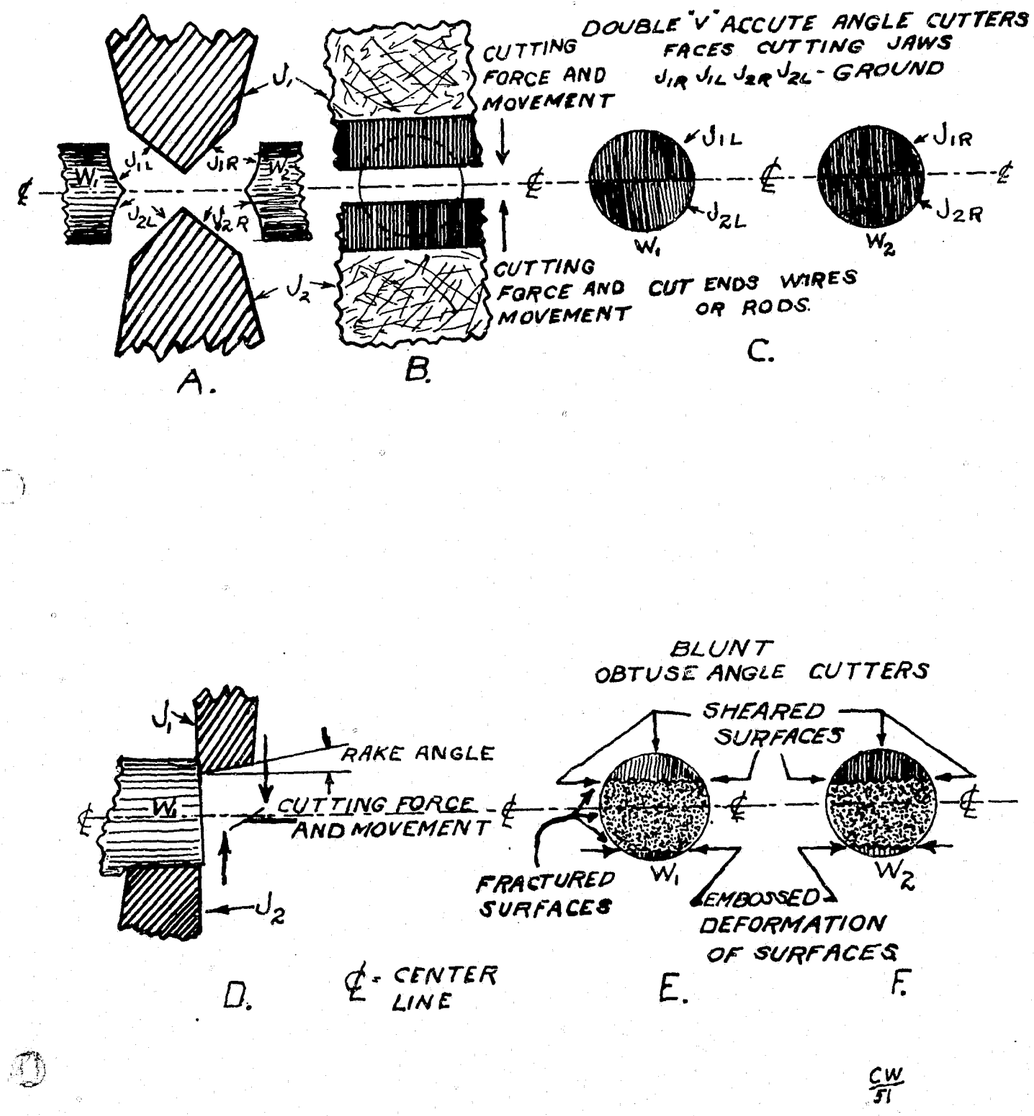
If the comparative micrography laboratory is able to demonstrate that individual characteristics of a particular type and kind of tool exists on the surfaces of two objects from burglaries or offenses committed at different places and at different times, then it can be reasonably concluded and reported to the submitting agencies that the same tool was used in deforming the objects at each of the two widely-separated burglaries.

Also, if the comparative micrography laboratory technician is supplied with deformed objects from the scene of burglaries and suspected tools which may be taken from the possession of a burglary suspect, he is often able to demonstrate that the deformation of the object in question at the scene of the burglary was accomplished by means of the particular tool submitted for examination and by no other. The value of findings of this type, which are admissible as evidence, need not be enlarged upon here.

When such a conclusion is possible on the part of the comparative micrography laboratory technician, he will then be in a position to report to the interested agency the similarities which exist. Subsequently his interpretation or the basis of his opinion later will be received in evidence before a court of record as a matter of expert opinion.

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Fig. 36 WIRE OR ROD CUTTERS



Source: Wisconsin State Crime Laboratory

Extensions of the subject of comparative micrography have been successfully accomplished in other fields such as cases involving mutilated or cut sections of bone from a victim's body. (See Fig. 37.) If a sharp or blunt object deformed the bone of a victim, leaving the reverse impressions of such objects on the surface of the victim's bone, the possibilities of identification by comparative micrography should be considered. Where a knife was used to dismember a body of a victim in a murder case and the knife had cut into several skeletal members of the victim, individual characteristics of the knife blade used were left in the surface of the bone so deformed or altered, thus providing the basis of comparison and identification of the suspected knife. In another case in which the victim was repeatedly struck about the head and face with a hammer, the determination of the class characteristics of the hammer were possible permitting a description of the type and size of the hammer used to be supplied to the enforcement agency. (See Figure 37.)

Under certain conditions information of value concerning the conditions of application of the force applied in deforming an object can be derived from a careful examination of the objects deformed. When an object is altered by another hard object, the application of the force producing the deformation may be in one of the following ways: an impact blow, the application of a steady force, or by the application of an intermittent force, or by the application of a steady force where slippage takes place in the process of cutting or deforming an object.

Very often a careful examination of the deformed object will answer the question not only as to the nature of the tool or object producing the deformation, but also as to the information of value concerning the method by which the deforming force was applied to the deformed object. Often times the nature and a description of the deforming object or tool may be determined and reported.

Sharp-edged tools used to cut another object deform the surface of the object cut. Usually in cases where a pocket knife, an ax, a chisel, a wood plane blade, etc., are used, this type of edged tool not only contains grinding and finishing marks but also acquires, as the result of use, certain accidental or individual characteristics which are microscopically identifiable as minute fractures or nicks in the cutting edge of the tool. These leave highly distinctive marks on the surface of objects cut or deformed in succession with a particular edged tool, thus providing the laboratory with a reliable means of identification of either a tool and an object cut or deformed with a particular tool; or as an alternative provide a comparison of two objects which have been cut or deformed with the same tool.

Under the statutes the commission of the crime of burglary presupposes forcible entry into the burglarized premises. In this

definition of the crime of burglary there is presupposed the basic mechanical forces just discussed.

The effectiveness of the laboratory technical aid which can be rendered to submitting agencies in burglary cases is almost wholly dependent upon the accuracy and completeness of information as well as the proper materials being recovered at the scene of a particular burglary and submitted to the Laboratory. We have prepared a list of the common tools or articles which are used in the commission of burglaries. This list appears in the discussion entitled "Burglary Investigations." It will be noted that in this table 45 objects are listed. In the appropriate column the possible identifications that may be made by the laboratory have been indicated.

Burglary is one of the most common felonious crimes committed today. Ninety per cent of all burglaries reported are committed at night. This, in part, accounts for the fact that the burglar or burglars are relatively seldom seen and for this reason seldom identified or connected with a particular burglary. The exception to this is in those rare cases where stolen articles can be positively identified or where a confession is obtained from one member of a burglar group. For these reasons, the enforcement agency must rely almost entirely upon the assembly of circumstantial evidence to establish the corpus delicti and tie the guilty party or tools to the crime or crimes committed.

The question of bringing the burglary investigation to a successful conclusion can only be measured in terms of the attainment of the following objectives: (1) positive identification and apprehension of the guilty participants and conspirators; (2) recovery of as much of the loot or proceeds of the burglary as possible; and (3) successful prosecution of all guilty parties. In the accomplishment of the stated objectives, the enforcement agencies must exhaust the possibility of circumstantial evidence and information available to them in each bona fide complaint which is received and investigated. As has been stated, the laboratory technical facilities are able to contribute much coordinated data and information if the information and physical evidence is properly collected, marked, and submitted to the laboratory. (Suggested Methods of Removal of Wood Parts of Screens, Windows, Doors or door jambs is illustrated Fig. 39 and 40 Before removal always obtain owner's permission.

When an agency receives a complaint of a burglary, in the course of the subsequent investigation the officer should make a very careful examination of the scene of the burglary. In this examination the possibility of latent fingerprints should always be kept in mind. Incidental to this search of the burglarized premises, the method of effecting entry to the building should be ascertained. If it is not obvious, the officer should carefully

examine every window, door, skylight, coal chute, etc., through which the burglars could have effected entry. If there are doors, locks, or safes which have been forced, the same careful consideration should be given to these objects in order to ascertain how entry into the locked object was effected. If locked file or fire cabinets have been forced, a safe has been punched or blown, or a desk drawer forced, a careful examination should be made of objects of this type to ascertain if there are any tool marks present on the surface. If any such evidence is found, an attempt approved by the owner, should be made to remove that portion of the object which contains the tool marks. As has been indicated, this should only be done after the approval of the owner has been obtained. In the removal of such parts every effort should be made to cut out that portion containing the tool mark in such a way that the original tool mark will not be changed. After marking properly for identification, the removed object should be submitted to the Laboratory with a case referral form giving complete data on this particular investigation. The proceeds of the burglary should be carefully listed in reporting this offense to the Laboratory. Particular attention should be given to the preparation of as accurate and complete a description as possible of any objects of loot which are discovered missing from the burglarized premises. In cases involving the theft of firearms, electrical tools and equipment, radios, welding torch regulators, every reasonable effort should be made to obtain the original serial number, make, color, type, style, and size of the objects stolen.

If an enforcement agency encounters in the possession of a burglary suspect, or of a person acting under suspicious circumstances, objects possession of which cannot be explained, the same complete and accurate description should be communicated to the laboratory. Any tools abandoned at the scene, or found in the car or in the possession of burglary suspects should be forwarded to the Laboratory for comparison with tool marks submitted by other agencies in their investigation of burglaries. Back issues of the Wisconsin Law Enforcement Bulletin file should be examined to ascertain whether or not objects of the type encountered have been previously listed as having been the proceeds of other burglaries reported to the Laboratory.

In those cases where objects are encountered and there is evidence that stamped serial numbers have been removed from metal objects or name plates, the Laboratory may be able to restore the serial numbers, thus assisting the enforcement agencies in tracing such objects.

If latent fingerprints are found at the scene of a burglary, either scaled photographs or the original lifts should be made available to the Laboratory for retention in our files where they will be subsequently cross-checked against other burglary fingerprints submitted. If the identities of suspects are made known to the Laboratory, efforts will be made to obtain fingerprints for comparison purposes.

The immediate locale of a burglary should be carefully canvassed to ascertain from people living nearby whether or not any unusual sounds were heard or automobiles seen or strangers observed in the vicinity at the time in question. Further, a careful search should be made of back areas, loading platforms, etc., in the immediate vicinity of commercial establishments to ascertain whether or not there are any footprints or tire impressions present which might be suitable for preservation.

If footprints or tire impressions are encountered, first of all, scaled photographs should be made of these. Following this, an attempt should be made to make a three-dimensional cast of any such foot or tire impressions. These foot and tire impressions should then be properly marked, packed and forwarded to the Laboratory for detailed examination and comparison with other such casts submitted. Under such circumstances the casts so submitted to the Laboratory will be retained for a period of approximately 60 days and then be returned to the original submitting agency. Such detailed information can be obtained from these cases and from the scaled photographs referred to and will be permanently retained in the laboratory files.

There have been included in this section of the manual Figs. 23, 39 and 40, which contain suggested procedures to be followed in recording necessary information and the proper recovery of tool mark impressions encountered in burglary investigations.

Where there appears to be any question as to the proper method of removal of parts of furniture, fire cabinets, file cabinets, safes, etc., it is suggested that the Laboratory be contacted by letter or in person for advice and counsel as to the most satisfactory method of making available the parts of these objects which would be suitable for examination and study by the Laboratory. See Fig. 23.

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

EXPLANATION OF FIGURE 37

Comparative Micrography Applied to Bone Specimens

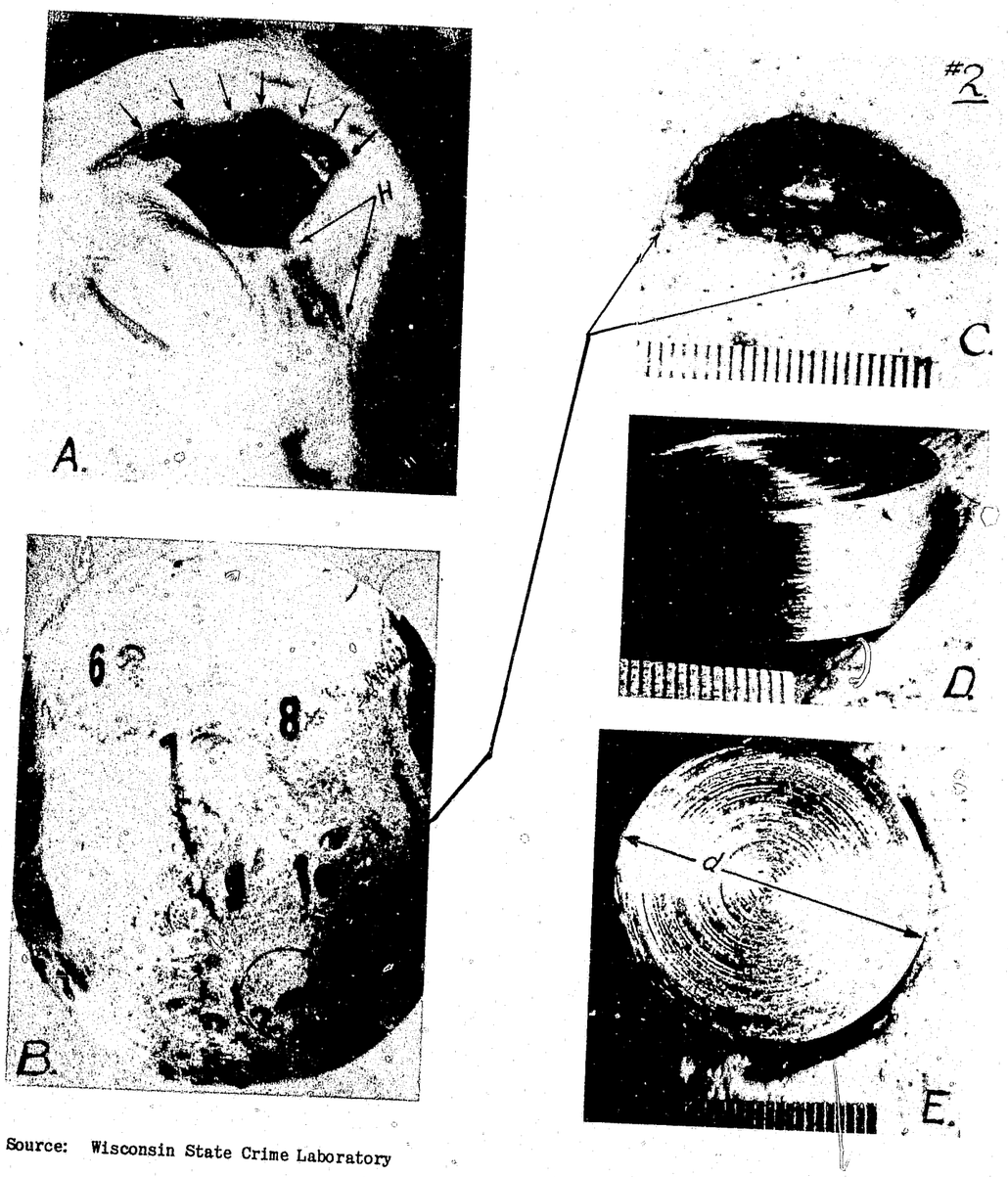
The following figure illustrates the application of comparative micrography to the skull of the victim in a murder case.

In this case the victim was repeatedly struck on the head and face with a hammer. The appearance of the forehead above the left eye is shown in A. The radial arrows indicate the curved object crushed the skull and tore skin in the forehead (probably the side of hammer was used). H in figure "A" refers to tear probably produced by the handle of the hammer. The top of the skull cap as removed at autopsy is shown in "B". The crushing and nicking of the skull by the hammer face are numbered in the photograph. Nick No. 2 was photographed and is reproduced at "C". A turned steel plug was made whose diameter very closely approximated the diameter of the face of the hammer. This steel plug, Photographs "D" and "E", has been placed in the crushed depression in the skull for photographing nick No. 2.

Summarized findings.

It is apparent that a curved hammer approximating the radius of the radial arrows in A was used and that one face of this hammer was circular in form and had a diameter approximating "d" in Photograph "E" or 1/2 inch. This description corresponds with a curved upholsterers hammer.

Fig. 37 COMPARATIVE MICROGRAPHY APPLIED TO BONE SPECIMENS



Source: Wisconsin State Crime Laboratory

BURGLARY INVESTIGATIONS*

Explanatory Note:

The material in this section was originally prepared for police officers. However, prosecuting attorneys and criminal court judges should be interested in reading it for the knowledge given of the basic rudiments of crime prevention and detection.

This section consists of the following:

A. "Burglary-Residence"
B. "Burglary-Commercial"
C. "Burglary-Safes"
D. "List of Burglar Tools"

A. BURGLARY-RESIDENCE

Operations of Residence Burglars

1. With residence burglars there is often a period of planning before the actual burglary when they visit the residential sections to select favorable places. During this period of visiting or casing, they may act as a ddor to door salesman, insurance agent, meter reader, window washer, stranger lost or confused, etc. They may carry faked or real credentials; and if acting as a salesman, they may carry samples or a sample case.

2. The purpose of this preliminary casing is to learn the hours the house is unattended, the movements of neighbors, the presence of patrolmen, the available means of entry and of get-away, etc. The observations may be casual or they may cover a period of several days. In rare instances they may continue for three or four weeks.

Suggestions for Police Officers to Give Householders

1. Residential inhabitants frequently advertise their absence by leaving a light burning in the front room with the shades up, the garage door open and no car in sight. Burglars call this a "set up."

2. A light should be left burning in a room not visible from the outside.

---

* Based on material prepared by Bureau of Trade and Industrial Education, California State Department of Education. Distribution restricted to Enforcement Agencies. Permission to use granted by John P. Peper, Supervisor, Peace Officers Training School, California State Department of Education.

Period Within Which B urglary Takes Place

1. Evening burglaries occur between 7:00 p.m. and 11:00 p.m., the hours when the occupants are attending social functions, movies, or visiting friends.

2. In the afternoons burglars often operate between 1:00 p.m. and 5:00 p.m., the time when occupants are out shopping, visiting, or at work, and when servants are out of the house.

Location and Operations of Residence Burglars

1. Amateur burglars and juveniles often operate in the vicinity in which they live.

2. Professional burglars often operate in a part of the city or county away from their residence and often come from other localities.

3. Automobiles play an important part in residence burglaries. They provide a quick get away, a convenient and disguised method for transporting stolen goods.

4. They may park their car in the driveway of the house to be attacked, behind the house or closeby.

Factors Affecting Selection of Residence

1. Absence of or poor street illumination

2. Houses set close together providing dark passageways

Modus Operandi of Residential Burglars

1. A careful study of the details of operations employed in each burglary, if properly catalogued and cross-indexed, will provide a valuable fund of information by which it is possible to link two or more burglaries to one burglar or to a team.

2. An amateur or juvenile burglar is often inconsistent in his M.O., but as he becomes more experiencedhe will become a specialist. He will seldom leave his field. He shows a marked narrowness of thought; for having been successful with one method, he believes it will suffice. For example, if he has been successful at entering through a back windown, he will probably follow the same course throughout his career.

3. Careful consideration given to loot or articles of value missing will sometimes provide a preliminary indication as to whether the burglary was committed by a professional, amateur or juvenile.

Tools Used

See below, subsection "D"

Methods of Attack

1. When working in pairs, one will ring the front door bell while the other goes to the side or rear of the house to listen. The man at the rear door will then knock, and if no response, he will check the garage to see if the car is gone.

2. A single burglar, working alone, will often resort to some of the subterfuges in 1. above to determine whether or not the house is vacant.

3. Some burglars will watch an intended victim's house from a nearby park or public place; others may observe an intended victim in his place of business and follow him home. A potential victim may have been seen to flash a roll in a public place, and will be followed home by the burglar who will enter the home when the victim is asleep.

Trade Marks

The burglar raids ice box, cooks meal, commits nuisances, cuts telephone wires, pulls main electric switch, prepares exit, leaves note, removes glass from windown without breaking it, uses glass cutter, pulls blinds, closes venetian blinds and turns one slat up, writes on walls, burns matches, etc.

Early Morning Burglar

1. He generally does not organize his work. He prowls the residential districts looking for open windows or other easy means of entry.

2. Either he enters while people are sleeping or he uses a pole or wire to retrieve articles left near windows.

3. Sometimes this type of burglar will commit a sex offense if a woman is alone in the house.

Day Burglar

He may pass himself off as a salesman, meter reader, window washer, or he may telephone to ascertain if victim is home. Some burglars watch the newspapers for funeral notices and burglarize the home of occupants who are attending the funeral.

Lookout

1. He may be a person strolling by outside--even perhaps presumably taking a dog for a walk. He may sit in a car or he may enter the house and watch from the window.

2. Frequently women will act as lookouts.

Evening Burglar (victim absent)

1. One type may park his car in the driveway. This type will usually take clothing, electrical appliances, radios, silverware, or household articles of relatively little value.

2. Another type may park his car a short distance away. This type will usually limit his loot to smaller articles such as money, jewelry, portable radios, etc.

Evening Burglar (victim home)

1. He is known as a party burglar or fishing pole burglar.

2. He will drive or walk around until he spots a party or gathering of people. He will then drive to the side or rear of the house and look for the room where the guests had placed their wraps.

3. He will either climb in and rifle the purses or fish them out with a stick. He usually takes only the money from the purses and throws the purses nearby.

Hotel Burglar

1. This type often rents a room and observes the habits of other guests.

2. Often two burglars will work together. They may be a man and woman.

3. They will knock on doors, or telephone the rooms, to ascertain if the occupants are absent. If so, then by using a pass key or lock picks, the enter room.

4. Another type retains their room key and returns later on to the room.

5. Another type of burglar prowls the hotel halls in the early morning hours, effects an entry and rifles through clothing and purses. He will usually only take money and jewelry.

6. If a hotel burglar is surprised in the act of opening a door, he may pretend he is drunk and has made a mistake in room or floor numbers. This type is usually quite bold and may be successful in convincing the house detective or guest that caught him that he made an honest mistake.

Apartment and Rooming House Burglar

1. Any of the hotel subterfuges may be used.

2. An accomplice or lookout may put an envelope in the mailbox. If the victim comes home and removes the envelope, the lookout will ring the bell of the apartment to warn his partner, before the victim has time to walk to the room.

Steps to be Taken in the Preliminary Investigation

1. Protect the scene from policemen not detailed to the investigation and from curious citizens.

2. Consider unusual conditions as suspicious circumstances until evaluated. Inconsequential details may provide important links with past or future offenses.

3. Do not obliterate footprints, fingerprints, tire marks or any other physical evidence of this type. Properly protect fingerprints until processed.

4. Cover footprints or tire tracks found outdoors with a box or board, and, if possible, detail an officer to protect it.

5. Contact persons living or working in the vicinity to ascertain if they saw or heard anything that might help the investigator.

6. Tool Marks: obtain owner's permission to remove material having tool marks. See Figs. 39 and 40. Do not try to fit suspected tool in tool marks at burglary scene.

7. Mark all evidence recovered for purposes of identification. This pertains both to evidence from the scene and from a suspect.

Making Burglary Report

1. Describe the property accurately and list any unusual articles whether they have value or not. The unusual articles will many times trip a suspect.

2. Tell the victim to get serial numbers whenever possible.

3. Make the report tell a complete story; give all details.

4. Do not reveal to the victim when the the detectives will be out to make their investigation.

Cruising

1. If you see a person who looks out of place in the neighborhood, because of his clothing, walk or mannerisms, he should be questioned. Proper identification should be registered.

2. If you see a car moving slowly with or without lights, follow and observe its actions for a reasonable length of time, and then overtake and question its occupants. Use extreme caution.

Preliminary Questions

1. When questioning, listen intensely to any explanations offered. Watch the suspects billfold closely when he is looking for his identification. You may observe pawn tickets or identification cards bearing another name.

2. Look for plaster or dust on his clothing; look for fresh cuts on hands and face; look at toes of shoes for scuffs, mud or grass.

Unusual Articles

Unusual articles would include articles normally used by the other sex, letters addressed to other individuals, cigarette lighter or suitcases having another's initials. The burglar may carry an unusual amount of small change, old coins, or even parts of a stamp collection.

Answering "Burglary in Progress" Call

Know your district. You should be acquainted with house numbers so that it would not be necessary to use a flashlight. Approach quietly. Don't slam car door. Turn off the radio receiver, but leave the microphone plugged in, for you may want to call for assistance.

At the Scene of the Burglary

1. Get a description of the suspect, if possible, and broadcast it. If you get a good description from the victim, start searching the vicinity at once, and interview the victim later.

2. Check parked cars, beer joints, cafes, pool halls, etc., in the vicinity. Also check streetcar and bus stops.

3. Any stolen car found in the vicinity should be held for prints since it may have been driven by the burglar.

***

B. BURGLARY - COMMERCIAL

General

1. Commercial burglaries are the most common for peace officers. The reason is that there is a greater chance for the criminal to make a personal gain.

2. Some of the more successful burglars will attack only certain types of commercial enterprises such as:

a. service stations
b. garages
c. grocery stores and markets
d. hardware stores
e. clothing stores
f. jewelry stores
g. manufacturing plants
h. schools
i. radio and appliance stores
j. chain or co-op stores

3. Commercial burglaries dealing with safes are discussed in the next article.

4. Commercial burglaries may be committed by one man or by a group.

5. Nearly every gang that operates successfully have their intended victims cased before attacking. The casing may be done by persons acting as customers, or as trades people, such as magazine salesman, ice cream vendors, fire inspectors, insurance inspectors, itinerant repairmen, window washers, taxi drivers, etc. In some cases even private patrolmen have been used.

6. In almost all cases this type knows the whereabouts of the patrolmen on the beat.

Types of Burglaries

1. Commercial burglaries are committed by various types of specialists. There are some burglars who attack only lofts, otherwise known as stock-rooms. Burglars may specialize in methods use to enter buildings--through a tunnel, skylight, roof, wall, smashed window and forced door. Some may hide in the building during the regular business hours.

2. Loft burglars are more common in the east. They generally are skillful, professional criminals; they calculate risks, profits, and methods of efficiency before each job.

   a. Usually the gang consists of three to five.
   b. One man--the "finder"--has the duty of locating possible loot and of observing the layout. He notes location and types of burglar alarms, the manner in which doors and windows are secured, the street and rear yard areas, and location of watchmen, if any.
   c. They usually gain entrance in one of the following ways:
      (1) They rent a vacant loft in the building below or above the one to be attacked. Access is then made by cutting a hole.
      (2) One person hides in the building during business hours.
      (3) They break into building from outside. Lookout replaces padlock on door in order to deceive the patrolmen.

3. Tunnel burglar. This type is not common. On some occasions banks have been entered by this type. This type have to case the premises very well in order to determine feasibility of a tunnel, what obstacles to avoid, and where final entrance can be made. The burglar may rent the building adjoining to use as his base of operations and for the disposal of refuse from the tunnel. False walls have been built so the refuse could not be seen from the street.

4. Skylight Burglar. He usually enters through skylight because building is wired for burglar alarm or building is too difficult to force entry in any other manner.

   a. He reaches roof by use of a ladder, adjoining buildings, sign boards, public service poles or by a rope and hook.

   b. After gaining acces to roof, he will either break skylight or slide out a section of glass. He lowers himself by a rope or garden hose.

   c. After burglarizing the building he may leave by a door or window or he may leave by climbing up the rope.

5. Roof Burglar. He gains access to roof in same manner as the skylight burglar. He bores holes in a section of the roof large enough to allow his body to slip through. Then by use of a keyhole saw he connects these holes until the section is cut out.

6. Wall Cutter. This type of burglar will break into a vacant building next to the one he wants to attack and then proceeds to cut a hole in the wall. Sometimes this burglar will cut through an outside wall from an alley or vacant lot. This type of burglar has been known to leave his tools by the hole.

7. Hide-out Burglar. He hides in the building during the business hours. At a predetermined time he will open the entrance way, usually a back door, for his accomplices. (A hide-out frequently is a solo operator) He may hide in the washroom, locker room, storeroom, under the counter, or behind merchandise.

8. Subterfuge Method. This method is successful in vicinities where police patrol is sparce. The method is to have a call placed for the patrol car to leave the area.

9. Window smasher. He is usually a youth, 15 to 20 years of age, who depends on fleetness of foot to make his get away. He will usually operate late at night or in the early morning hours when the streets are deserted. He will throw a rock or box through the window glass, grab some merchandise and run.

10. The jimmy or strong-arm Burglar. This type forces their way into the building. (See list of tools below.) In this case the tool will leave valuable evidence in the marks and they should be preserved. Entrance may be forced by using a railroad tie or a 6 to 8' length of heavy timber placed between the door and the the rear axle of the car. Footprints may be found on shelves, counters, chairs, etc. This burglar will take fountain pens, typewriters, adding machines, check protectors, checks, liquor, cigarettes--most anything of value he can carry in a bag, on his person or in the car.

When investigating, officers should have victim look through his

check book. Some burglars will take checks from the middle or back of check book thinking they will not be missed for some time. He would then have time to pass real but forged checks.

11. Other Means of Entry

a. By standing on automobile in order to reach fire escape or window
b. By crawling through ventilator on side of building
c. By prying sheet iron with bumper of automobile
d. By climbing through transom of outside door
e. By forcing iron gates or shutters

Lookouts

1. They may be disguised as dog walker, neckers, simulated drunks, persons urinating by a building, person working on a car, etc.

Vehicles Used by Burglar

1. Panel or stake trucks, station wagons

a. Trucks with name of legitimate firm painted on side is often used as a blind.
b. Trusted day employee may use his firm's truck at night for committing burglaries.

2. Four-door sedan with removable back seat, and with extra large rear springs.

Tools to Watch for in Vehicle Shakedown

1. Watch for any cutting, drilling, punching, chopping or prying bars listed in table in section below.

2. Pay particular attention to wrapped or taped tools. Rubber is wrapped around tools to deaden sound.

3. Watch for short length of wire with snaps on each end--it is used to jump burglar alarm systems.

4. Look for rope, garden hose, and hooks.

When Stopping Vehicles

Regardless of the reason for stopping the vehicle be on the alert for stolen merchandise and burglar tools. Search car thoroughly. A burglar may commit a traffic violation because he is thinking about the attack, and not about driving his car.

Answering a Report of a Burglary

Check for burglar's place of entry. Try the roof, if necessary. Fire departments should cooperate, when called upon to assist peace officers to climb onto the roofs of buildings.

Making the Preliminary Investigation

1. Protect the scene from policemen not detailed to the investigation and from curious citizens.
2. Consider unusual conditions as suspicious circumstances until evaluated. Insonsequential details may provide important links with past or future offenses.
3. Do not obliterate footprints, fingerprints, tire marks or any other physical evidence of this type. Properly protect fingerprints until processed.
4. Cover footprints or tire tracks found outdoors with a box or board, and, if possible, detail an officer to protect it.

5. Contact persons living or working in the vicinity to ascertain if they saw or heard anything that might help the investigation.

6. Tool Marks: obtain owner's permission to remove material having tool marks. See Figs. 39 and 40. Do not try to fit suspected tool in tool marks at burglary scene.

7. Mark all evidence recovered for purposes of identification. This pertains both to evidence from the scene and from a suspect.

8. Ascertain method of entry and exit. Unusual conditions should be noted and tools listed in section below should be submitted to the Wisconsin State Crime Laboratory.

Making Burglary Report

1. Be sure the report tells a complete story. Give all details.

2. Some of the more important items that should be in the report are:
a. name of victim or commercial establishment, date and time of burglary as nearly as possible
b. correct trademark, if possible
c. license numbers and description of suspects' cars
d. tools used (See Figure 23, 39, and 40; and table of tools as listed in section below.)
e. list of physical evidence recovered, such as fingerprints, etc.
f. complete description of stolen property or proceeds of burglary
g. description of suspects, if any
h. description of premises attacked
i. Advise the Laboratory of other burglaries known and suspected of being connected with this particular burglary.

It is recommended that the information in this list be sent to the Wisconsin State Crime Laboratory, Madison, Wisconsin.

***

C. BURGLARY - SAFES

The types of safes or fire cabinets commonly used to safeguard valuables are:

Fire Cabinets or Safes

This type of security cabinet is primarily intended for the protection of currency or valuable papers in the event of fire. It affords little protection against burglaries. These fire cabinets either contain multiple sliding file drawers or simulate the conventional safe in appearance and internal arrangement. These fire cabinets are equipped with a cylinder lock, lever lock, or a dial type combination lock. They have a double wall of light sheet metal. Firewall material fills the space between this double thickness of sheet metal.

Old Fashioned "Safes"

This type of security "safe" cabinet was very popular at the turn of the century. It uses a double-walled box, the inner enclosure often being made of wood; the outer sides, back, top and bottom employes mild sheet steel of thickness of approximately 12 guage. The front is closed by a hinged door equipped with a dial type combination lock, a bolt handle and an arrangement of levers or cams inside of the door so that when locking the door bolt, bolts or pins slide into corresponding recesses at the sides and/or top and bottom of the front stepped recess or door frame. In this type the front door outer plate is usually 3/16 or 1/4 inch mild steel plate. The edges or corners are often arranged using 1/4 inch mild steel angle iron riveted to the thin sheet steel sides, top or bottom.

Under attack conditions either fire cabinets or the old fashioned combination lock safe may be easily opened by any one or combination of the following methods.

1. Cutting of sheet metal walls by use of mattock or pick
2. Using "can opener" or plate ripper
3. Peeling metal front, sides or bottom
4. Using explosives
5. Using pry bar
6. Punching
7. Picking lock (when secured by means of cylinder or lever lock)
8. Drilling
9. Using power driven abrasive saw discs
10. Using cold chisel and sledge hammer

The fire cabinet type of security container can be opened under attack conditions more easily than the outmoded safe described.

Modern Sunken Tubular or Rectangular Safe

This type of safe is equipped with either a good dial combination lock or multiple locks including two lever-type locks requiring two keys used simultaneously to open. The door is constructed from heavy circular steel plates. These safes often include successively laminated mild steel and alloy steel plates. Heavy copper plates are sometimes sandwiched between the steel plates to minimize a successful attack employing a cutting torch. This type of safe is usually installed either in the ground below the cement floor or in a slab set in a poured cement base anchored to the building. In the latter case it is possible to "mud cap" an explosive charge on the poured cement shell which, when detonated, will crack the cement anchoring the safe so that the safe tube or box can then be transported and later opened, under circumstances where time, tools for opening safe, and noise minimize chances for apprehension.

This modern type of safe affords a maximum protection, if properly installed.

It is relatively seldom that an attack has successfully been made at the original location because of the time consumed and difficulty in opening the safe under attack conditions. In those few instances where successful attacks have been made the entire safe has been carried away and presumably opened leisurely at some distant place.

Bank Type Vaults

This type comprises a steel reinforced poured cement room or vault equipped with a very heavy laminated steel plate door having locking pins which slide into recesses in the stepped steel door frame. The door is usually equipped either with a combination dial type lock, a multiple dial type combination lock or a time lock plus a dial type combination lock.

The second type of vault that is frequently used as record storage rooms is considered a vault but very often is intended merely as protection against fire. The walls may be either hollow tile or poured cement. In either case the vault may be easily entered through the walls or ceiling. This type of vault is equipped with a 1/4 or 3/8 inch mild steel door plate bolted or riveted to a cast iron stepped frame which is hinged. This door is usually equipped with pins sliding into recesses around cast door frame and a dial type combination lock. This type of vault door can be opened fairly easily by one or a combination of the 11 methods previously listed.

Investigation of Safe Burglaries

Given below are the important considerations that must be covered in a thorough investigation of any safe burglary:

1. If a suspect is arrested and under investigation, all clothing

should be immediately removed, and each article wrapped separately (see the table "Instructions for Handling, Shipping and Preserving Evidence" and Figures 8, 9 and 10) and immediately forwarded to the Wisconsin State Crime Laboratory.

2. If the suspect is in an automobile when apprehended, any tools recovered should be marked for identification and forwarded to the Wisconsin State Crime Laboratory together with any articles of clothing, gloves, etc., found in the car.

3. Review preceding section of the manual "Burglary - Commercial" for suggestions applicable concerning parts of investigation which otherwise may be overlooked.

4. Carefully check the scene of the burglary for latent fingerprints. Include in this check articles known to have been displaced or moved.

5. If fingerprints were obtained, fingerprint all employees for elimination purposes.

6. Check polished floor surfaces or any papers on the floor for footprint impressions.

7. Check the area adjacent to the burglarized building for tire or footprints that may be connected with the commission of the burglary.

8. Obtain an accurate, detailed description of all missing property or loot.

9. Check type and loss-payable clause of any insurance carried.

10. Interview all persons having access to the premises, including night watchman, patrolman on beat, last person to leave premises prior to burglary, and person who discovered and reported burglary. This check should include all occupants or employees of adjacent property.

11. Attempt to trace any tools recovered. If tools that are found are foreign to burglarized premises, mark them for identification and forward them to the Wisconsin State Crime Laboratory. (List of forty-five tools used in the commission of burglaries on page of manual.)

12. If explosives are recovered, do not attempt to transport them. Advise the Laboratory immediately by phone, radio or wire regarding disposal.

13. Take scaled photograph of safe attacked. (See Figure 23.)

14. If firewall material of metal top, sides, back, bottom or door of safe has been penetrated exposing firewall material, approximately 1/2 cubic inch of the material should be packed as shown in Figure 6 (#5, 8, 9 or 10) and forward to the Wisconsin State Crime Laboratory as standard material.

15. If the safe is to be repaired, obtain permission of owner or manager to remove parts of safe or safe locks punched or damaged in commission of burglary and forward such to the Wisconsin State Crime Laboratory. If possible, obtain name of maker of safe, also serial number. This also applies to toolmarks made in entering burglarized premises. (See Figures 39 and 40.) If safe is hauled away from burglarized premises, an accurate and complete description of the safe should be obtained. This should be incorporated in a 10-70 radio message addressed to all Wisconsin police radio stations. Also the contents of this message should be mailed to the Wisconsin State Crime Laboratory.

16. If currency bags, coin wrappers, checks, etc., are listed as proceeds of burglary, this information should be included in the radio message.

17. If the safe is to be abandoned by owner, advise the Laboratory and if it is not too large or heavy to be transported in a squad car, make the arrangements to have it sent to the Laboratory in Madison where facilities are available for properly cutting out any toolmarks existing on metal surfaces.

D. LIST OF BURGLAR TOOLS

The accompanying list of 45 burglar tools has been prepared to aid enforcement agencies in recognizing the evidentiary and investigative possibilities in the preliminary field evaluation that must be made locally by officers attached to police departments, sheriffs' offices, etc.

All of the tools listed are known to have been used in committing burglaries. In investigations they may be expected to produce toolmarks which if properly preserved and made available for laboratory examination and study may contribute valuable information not otherwise available to the investigation.

In order to clarify nomenclature used in the preparation of this list of burglars' tools representative types of tools are illustrated in this manual. It will be observed that in the list of tools, the tools have been numbered and listed by name. Opposite each tool listed is the number of a figure found in the manual. These figures illustrate the particular type of tool to which the table refers.

In the second column, headed "Identifications Possible," it will be observed the following designations have been used to suggest the ultimate investigative and evidentiary possibilities to be expected, if the proper materials are made available to the laboratory for examination and study:

I - Particular tool may be identified by individual characteristics.

C - Type or size (class characteristics) to tool may be determined.

None - Only under unusual circumstances can information of value be obtained from burglarized premises.

All of tools listed, found in the possession of burglary suspects without corroborated explanation, should be considered as a suspicious circumstance. It is suggested the articles be seized and forwarded to the Laboratory for examination and possible comparison with materials from burglaries submitted by other agencies.

D. TABLE OF TOOLS USED IN THE COMMISSION OF BURGLARIES

POSSIBLE IDENTIFICATIONS

I - Individual Characteristics Peculiar to a Particular Tool

C - Class Characteristics Type and Size, How Used

Note: Identification or Determination of class characteristics may be possible with materials from two different burglaries or materials from a burglary and tools recovered from the suspect or his automobile.

	ILLUSTRATED IN MANUAL	POSSIBLE IDENTIFICATIONS
1. Wrecking or Pry Bars	B1, 5, 4 Fig. 43	I - C
2. Crow Bars	B2 and 3 Fig. 43	I - C
3. "Can Opener" or Plate Ripper	Not Shown	I - C
4. Tire Irons	" "	I - C
5. Screw Drivers	B7 - B8 Fig. 41	I - C
6. Cold Chisels	B4, 5 and 6 Fig. 41	I - C
7. Drift Pin Punches	B1, 2 and 3 Fig. 41	I - C
8. Pick Axe	A1 Fig. 43	I - C
9. Grub Hoe or Mattox	A2, 3, 4, 5 Fig. 43	I - C
10. Hand Axe	Not Shown	I - C
11. Modified Wheel Puller	" "	I - C
12. Bolt Cutters	Fig. 44	I - C
13. Slip Joint, or Combination Pliers	A7 Fig. 41	I - C
14. Wire Cutting Pliers, or Diagonal Wire Cutters	A1,2,3,4,5,6 Fig. 41	I - C
15. Hydraulic Jack - Mechanical or Screw Jack	Not Shown	I - C
16. Carpenters Saw	" "	C
17. Hack Saw or Hack Saw Blades	" "	I - C
18. Keyhole Saw (Metal Blade Only)	" "	I - C
19. Stilson-type Pipe Wrench	" "	I - C
20. Twist Drills (from 1/16" to 3/4" diameter)	" "	I - C
21. Electric or Breast Hand Operated Drill	" "	C
22. Bare or Insulated Electric Wire - Wire Only	" "	I - C
23. Cement or Tile Drill - Star Drill - Drills Only	" "	C

TABLE OF TOOLS USED IN THE COMMISSION OF BURGLARIES (CONT'D)

POSSIBLE IDENTIFICATIONS

I - Individual Characteristics
Peculiar to a Particular Tool

C - Class Characteristics
Type and Size, How Used

	ILLUSTRATED IN MANUAL	POSSIBLE IDENTIFICATIONS
24. Power Abrasives Saw Discs	Not Shown	C
25. Carpenter's or Wood Brace	" "	None
26. Wood Bits - 3/8" Diameter and Up	" "	I - C
27. Chain Drill	B9 Fig. 41	None
28. Mauls	Not Shown	I - C
29. Hammers (light)	Fig. 42	I - C
30. Hammers (medium)	Fig. 42	I - C
31. Hammers (heavy)	Fig. 42	I - C
32. Sledge Hammers - 12 to 20 lb.	Fig. 42	I - C
33. Pass Keys	Not Shown	None
34. Lock Picks	" "	None
35. Celluloid Strips-Steel Clock Spring-Table Knife	" "	None
36. Oxy-acetylene Cutting Torches*	Fig. 38	C

*Commercial variations of Oxy-acetylene are illustrated in Fig. 38. If equipment of this type is recovered, some regulators and torches are serial numbered, this in some instances permits the previous ownership of the equipment to be established. Acetylene or oxygen tanks are numbered. In the case of acetylene tanks, this serial number can seldom be traced. However, most oxygen tank serial numbers can be traced.

Oftentimes torches and regulators owned by construction companies, etc. are stamped with the initials of the owner. Any serial numbers or stamped numbers on torches, regulators, or tanks which have been obliterated by grinding or filing usually can be restored by the laboratory.

TABLE OF TOOLS USED IN THE COMMISSION OF BURGLARIES (CONT'D)

LIST OF EXPLOSIVES AND MATERIALS USED WITH EXPLOSIVES WHICH HAVE BEEN KNOWN TO BE USED IN BLOWING SAFES

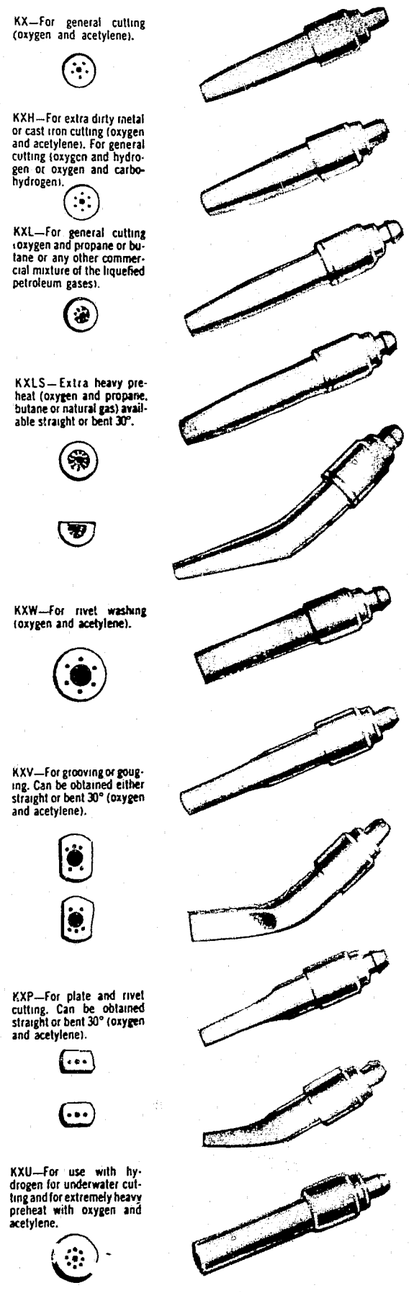
POSSIBLE IDENTIFICATIONS

I - Individual Characteristics
Peculiar to a Particular Tool

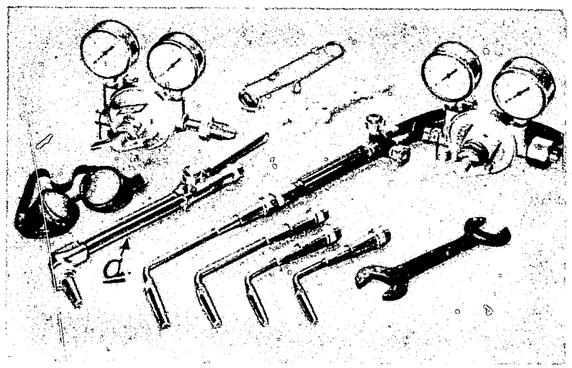
C - Class Characteristics
Type and Size, How Used

	ILLUSTRATED IN MANUAL	POSSIBLE IDENTIFICATIONS
37. Nitroglycerine	Not Shown	C
38. Brown Laundry Soap or Soap Paste	" "	C
39. Tri-Nitro Toluene (T.N.T. Blocks)	" "	C
40. Prima Cord	" "	C
41. Safety Fuse (Blasting Fuse)	" "	I - C
42. Electric or Blasting Caps or Detonators	" "	I - C
43. Gelatin Dynamite	" "	C
44. Clay, Sand, or Rock Salt (for mud capping)	" "	I - C
45. Adhesive Surgical or Friction Tape, Paper Scotch Masking Tape	" "	I - C

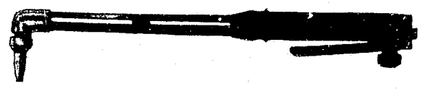
Fig. 38 OXY-ACETYLENE CUTTING TORCHES



Source: Wisconsin State Crime Laboratory



B. Combination welding and cutting equipment with regulators; wrenches, goggles, and spark igniter. Either the welding and brazing tips or the cutting adapter (a) can be used on this combination handle.



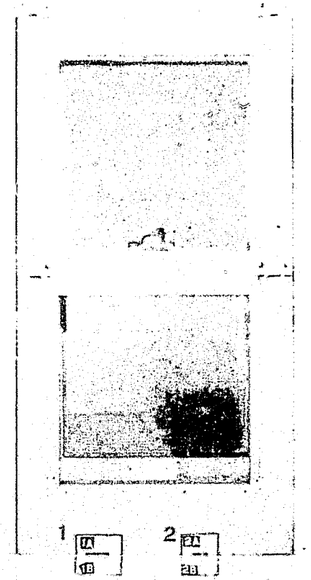
CUTTING TORCH

C. This torch can only be used for cutting and utilizes one of the cutting tips shown in A.

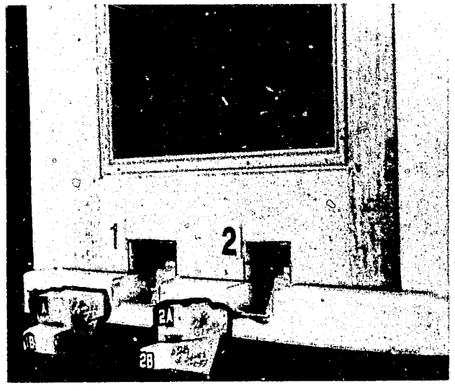
University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

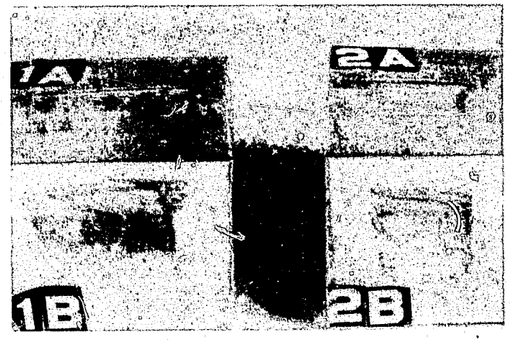
Fig. 39 REMOVAL OF EVIDENCE OF TOOL OR PRY MARKS -- WINDOWS OR SCREENS



A. Type of pry mark encountered at edge of window or screen pried open--forcible entry. Screen sash tool, Mark No. 1, labeled 1A. Tool Mark No. 2, bottom edge of screen, labeled 2A. Tool marks in window sill. Tool 1--1B; Tool 2--2B. Area where saw kerfs should be made in sill and frame outlined in wax pencil.



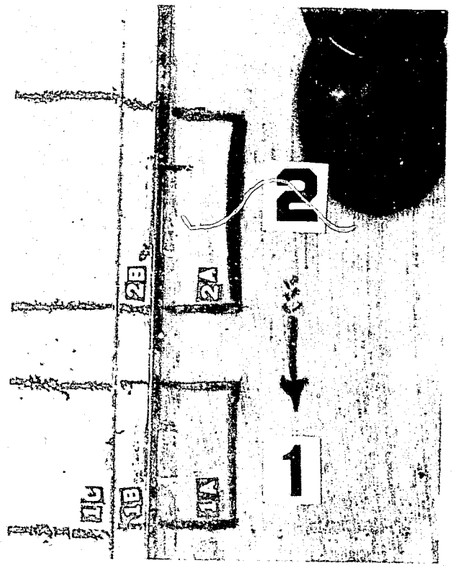
C. Pieces from frame and sill separated showing tool mark impressions of tools 1 and 2 on the pieces which should be sent to the Laboratory.



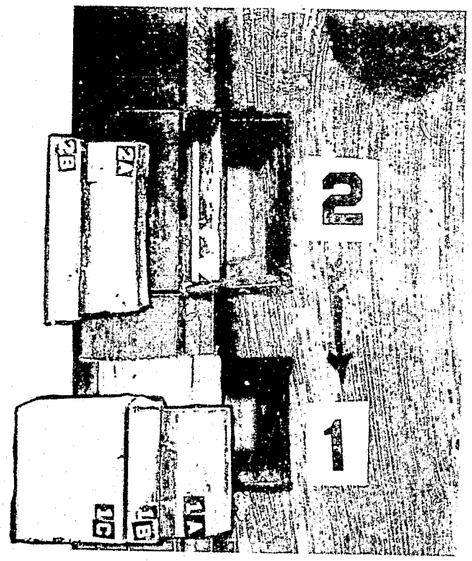
B. Saw kerfs have been made and pieces containing tool marks have been removed and displaced. Mark each piece for identification as shown.

Source: Wisconsin State Crime Laboratory

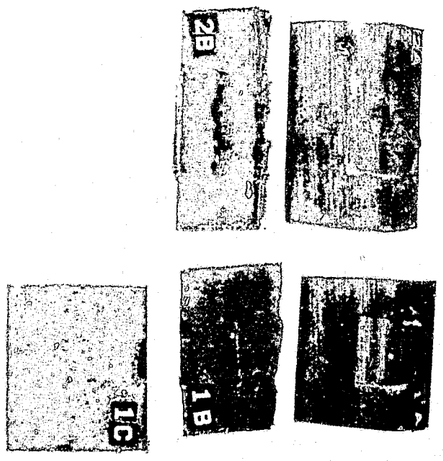
Fig. 40 REMOVAL PRY BAR OR TOOL MARKS DOORS - DOOR JAMS



A. Type of pry mark encountered in edge of door pried open. Tool Mark No. 1 labeled 1A. Tool Mark No. 2 labeled 2A. Tool marks in door jam, Tool 2.
Jam 2B; Door 2A. Area where saw kerfs should be made in door and jam outlined in wax pencil.



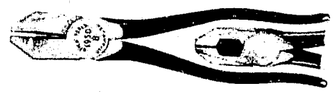
B. Saw kerfs have been made in the jam and door and pieces containing tool marks have been removed and displaced. Mark each piece for identification.



C. Pieces from jam and door separated showing tool mark impressions of Tools 1 and 2 on pieces which should be sent to the laboratory.

WIRE CUTTING PLIERS — Fig. 41

Lineman's Side Cutting Pliers



A-1

Electricians' Standard Side Cutting Pliers

A-2

Electricians' Diagonal Pliers

A-3

High Leverage Diagonal Pliers

A-4

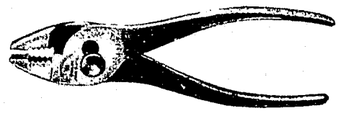
Bulldog End Cutting Nippers

A-5

Giant Button's Pliers

A-6

Slip Joint Combination Pliers



A-7

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

PUNCHES COLD CHISELS

Drive Pin Punches

These punches are 8 inches long and have a knurled grip of 4½ inches. Pin drive is 3½ inches long. Designed to stand hard use. Made of steel, hardened and polished.

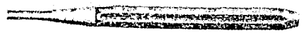
Diameter of Point.....inches	⅛	3/16	¼	5/16	⅜

B-1

SOLID PUNCH

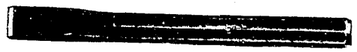
B-2

DRIFT PUNCH



B-3

Hand Cold Chisels

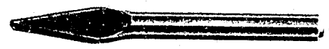


B 4

Size of Stock, Inches	Width of Bit, Inches	Length Inches
¼	5/16	5
5/16	⅜	5¼
⅜	7/16	5½
7/16	½	6
½	5/8	6¼

Size of Stock, Inches	Width of Bit, Inches	Length, Inches
5/8	¾	7
¾	⅞	7½
⅞	1	8
1	1¼	8½

Round Nose Chisels



B-5

Width of Bit, Inches	Size of Stock, Inches	Length, Inches
¼	½	6¼
5/16	½	6¼
⅜	5/8	7

Width of Bit, Inches	Size of Stock, Inches	Length, Inches
½	¼	7½
5/8	⅜	8
¾	1	8½

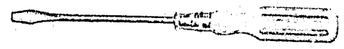
Cape Chisels

B C

Width of Bit, Inches	Size of Stock, Inches	Length, Inches
¼	½	6¼
5/16	½	6¼
⅜	5/8	7

Width of Bit, Inches	Size of Stock, Inches	Length, Inches
½	¼	7½
5/8	⅜	8
¾	1	8½

Screwdriver



B-7

B-8

CHAIN DRILL
YANKEE

B-9

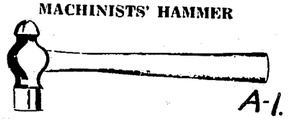
Source: Wisconsin State Crime Laboratory

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Fig. 42

HAMMERS (SHORT HANDLES)

MACHINISTS' HAMMER

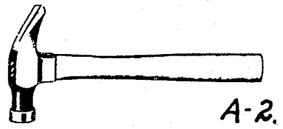


A-1.

Forged steel. Head Stafford brown enamel with polished face, poll, pein and sides. Hickory handle.

Wt. head, oz. ..	16	20	24	28
Lgth. handle, in.	14	15	15½	15½

RIPPING HAMMER

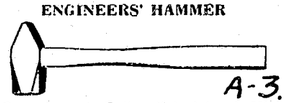


A-2.

Forged steel. Head Stafford brown enamel with polished face, poll, front of claws and sides. Hickory handle.

16 oz. head.

ENGINEERS' HAMMER



A-3.

Forged steel. Full polished head. Hickory handle.

40 oz. head

A-4.

Curved Claw

Nos.				
Wt. head, oz..	7	13	16	20
Wt. doz., lbs..	10	15	18	22

A-5.

Straight Claw, Ripping Pattern

Nos.		
Wt. head, oz.	16	20
Wt doz., lbs.	18	22

SLEDGES (LONG HANDLES)

B-1.

No. 325 (850)—Double Face Blacksmiths' Sledges

Weight, lbs.	6	8	10	12

B2

Forged steel, black finish, polished face.

—Oval Face Stone Sledges

Weight, lbs.	8	12	16

B-3

Forged steel, black finish, polished faces.

—Long Pattern Striking Hammers

Weight, lbs.	4	6	8	10

B-4.

Forged steel, black finish, polished face.

—Cross Pein Blacksmiths' Sledges

Weight, lbs.	8	10	12

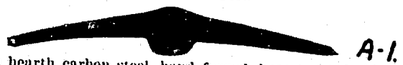
Source: Wisconsin State Crime Laboratory

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

Fig. 43

EDGED PICKS

RAILROAD PICKS



A-1.

Open hearth carbon steel, hand forged, heat treated; black finish, polished points. Eye No. 6.

PICK MATTOCKS

A-2.

Open hearth carbon steel, hand forged, heat treated; black finish, polished blade and pick. Eye No. 6.

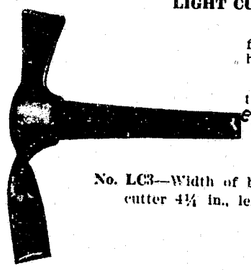
MATTOCKS

A-3.

Open hearth carbon steel, hand forged, heat treated; black finish, polished blade and cutter. Eye No. 6.

	Per dozen
—Width of cutter 3½ in., width of hoe 3½ in., approximate length over all 15¾ in.; wt. each 5 lbs.	

GARDEN MATTOCKS
LIGHT CUTTER



Forged steel, red lacquer finish, oil tempered, with hickory handle.

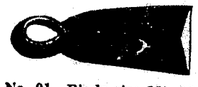
For light grubbing work in the garden or orchard or general utility work on the farm. Eye No. 7.

A-4.

No. LC3—Width of blade 3 in., length of cutter 4¼ in., length over all 13 in.;

GRUB HOES

A-5.



Open hearth, carbon steel, hand forged, heat treated; black finish, polished cutting edge. Eye No. 8.

No. 01—Blade size 3¾x7¾ in., length over all 10¾ in.; wt. each 3½ lbs.

EDGED BARS

CARPENTERS' BARS

B-1.

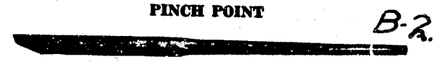
High grade octagon tool steel, with point and flanged claw, which prevents bending of nails.

Goose Neck Pattern

Steel, in.	½	⅝	¾	¾	¾
Length, in.	12	18	24	30	36

CROW BARS

PINCH POINT



B-2.

Special open hearth carbon steel, hand forged, heat treated; black finish.

Weight each, lbs.	12	18	22	26
Length, in.	51.	60	66	66
Square, in.	1⅛	1¼	1⅜	1½

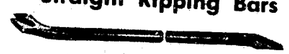
WEDGE POINT

B-3.

Special open hearth carbon steel, hand forged, heat treated; black finish.

Weight each, lbs.	12	18	22
Length, in.	51	60	66
Square, in.	1⅛	1¼	1⅜

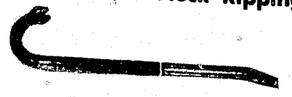
Straight Ripping Bars



B-4.

Size
½ in. x 12 in.
⅝ in. x 18 in.
¾ in. x 24 in.
¾ in. x 30 in.
¾ in. x 36 in.

Goose Neck Ripping Bars



Forged from high grade hexagon tool steel and are exceptionally strong and sturdy. Body black baked japan. Bits nicely polished.

Size
½ in. x 12 in.
⅝ in. x 18 in.
¾ in. x 24 in.
¾ in. x 30 in.
¾ in. x 36 in.
HEAVY DUTY BARS
¾ in. x 30 in.
¾ in. x 36 in.

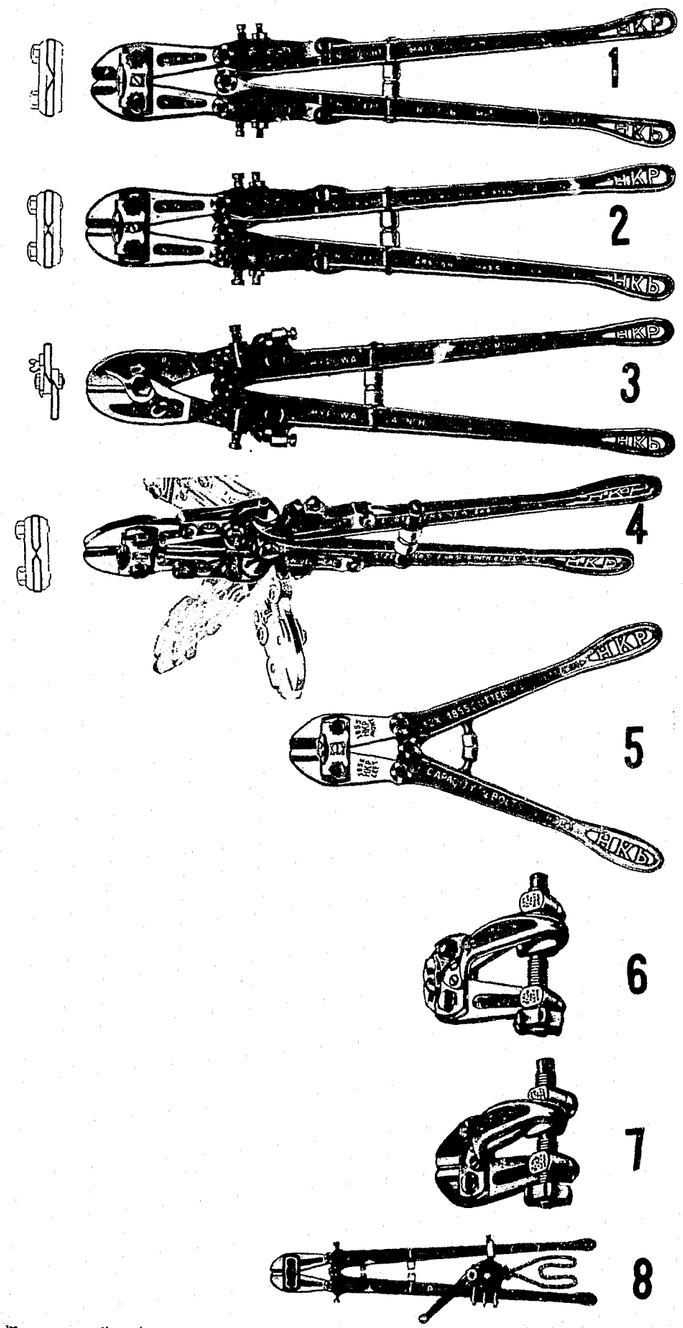
B-5

Source: Wisconsin State Crime Laboratory

CONTINUED

2 OF 3

Fig. 44 BOLT AND BAR CUTTERS



COLLECTION OF STANDARDS FOR COMPARISON

IN QUESTIONED DOCUMENT EXAMINATIONS

In the course of a questioned document investigation, it is necessary to collect proper written samples (standards or standard exemplars), whose authorship is known, for comparison with some questioned writing. The collection of proper standards is one of the limiting factors placed on the document examiner. If, for example, poor or inadequate standards are submitted for comparison with the questioned documents, the examiner can usually give no opinion or only a qualified one. Because document examiners have often received unsatisfactory samples of known writing, the following suggestions are given. These are given to aid the person who will actually obtain the standards as well as those not directly concerned. When these suggestions are followed, the results will generally give the proper and adequate exemplars necessary for the examiner to form an opinion.

In document cases there is first a document which, for some reason, is being questioned. It is usually necessary to submit the original questioned document, as many of the examinations can only be made on the original. Photostatic copies are not satisfactory and may even lead to a false conclusion. A scaled photograph properly taken may be used as a substitute when the original is not available.

Classes of Questioned Documents

The reason for the questioning of a document may fall into one of a number of categories. Osborn[1] gives eight major classes of questioned documents:

1. Documents involving questioned signatures. Under this heading are included signed checks, receipts, contracts, deeds, wills, and the like. The question submitted is, "Is the signature genuine or is it a forgery?" It is usually possible to answer that question when proper and adequate standards are available. Because of the limited amount of questioned writing and the frequent use of disguise, these types of comparisons usually require considerable exemplar material.

2. Documents alleged to contain fraudulent alterations. Here the question may be whether there is an erasure, interlineation, or other alteration of the original instrument. Such problems as a "raised" check or bank note, an erased payee on a check, and an addition to a will are included here. It is possible to answer the questions raised by making an inquiry into the identity of the

[1] A. S. Osborn, Questioned Documents, 2nd Ed., Albany, 1947, p. 12.

writing instrument, by examining the line sequence, by examining microscopically the fiber disturbance, by chemically testing the ink, and by other testing techniques.

3. Documents which are questioned in their entirety. These include a great variety of different types of documents, a few examples are: anonymous and threatening letters, some bogus checks, important letters and legal documents, and many others. Whether they are genuine or fraudulent can be answered with adequate exemplars.

4. Documents whose age is questioned. This is a specialized category and may be easily overlooked by an improper examination. This class of documents includes "old" wills, manuscripts, letters, and legal papers and often contain certain incongruities within the document. Some examples are: The handwriting system used was not developed until after the date of the document; the paper contains a water mark which postdates the alleged date of the document; and similar facts relating to paper, ink, and typewriter. Although the time needed to conclude one of these examinations may be relatively long, the type of evidence produced can be singularly damaging to the genuineness of a disputed document.

5. Documents questioned because of the materials used in their production. For instance, the ink in one part of the document may appear to be different compared with that in another part, whereas it should be identical; or the typewriting may have been done on two different machines instead of only one; or the last page of a will does not appear to be of the same kind of paper as the other pages, etc. The two categories of age and materials used are interrelated.

6. Documents questioned relative to typewriting. Under optimum conditions it is possible to ascertain the manufacturer of the typewriter used, and with adequate reference material it is possible to approximate the date of manufacture of the typewriter. It is also possible to determine whether the typing was done on a particular machine, whether the document was done all at one time, and sometimes whether a given typist may or may not have done the typing.

7. Documents reportedly identifying someone by means of his handwriting. This entails such instruments as bogus checks, anonymous and threatening letters, and miscellaneous writings. The question is specific, namely, "Did a certain suspect write the material in question?" With proper and adequate standards it is frequently possible for a document examiner to form an opinion as to whether the suspect wrote a given specimen.

8. Genuine documents whose authenticity is attacked either erroneously or fraudulently. Types of documents under this heading are quite varied, as are the reasons for and types of attacks made

on them. In some instances, an individual may have forgotten he wrote and/or signed a given instrument. In another case a genuine document, such as a will, note, or check, may for fraudulent reasons be denied. There are usually several methods of proof, and in all methods, proper standards are necessary for a definite opinion.

Some "Don'ts" In Handling Documents

The care and preservation of questioned documents is extremely important as the value of a document may be completely destroyed if it is not properly preserved. If the document is to be processed for latent fingerprints, it should be sent to the laboratory immediately, as the time lapse is critical in developing good fingerprints on paper. The document should be placed in a protective folder, kept flat, and not handled thereafter. A very satisfactory protective cover is a transparent celluloid envelope, as this affords visual examination without further handling when the document is placed unfolded in it. The following is a list of "don'ts" relative to the handling of a questioned document:

Don't handle excessively.
Don't cut or tear.
Don't make erasures on the document
Don't perforate or puncture the document.
Don't soil or wrinkle it.
In general, don't do anything to it that will cause a change in its appearance or physical make-up.

Don't fold and unfold.
Don't mark or write on the document.
Don't wet the document.
Don't carry it in a pocket or billfold.
Don't heat or expose it to sunlight or other source of strong radiation.

The use of staples, paper clips, thumb tacks, and scotch tape should all be avoided. When it is necessary to mark an original document for identification, this should be done in an unimportant area, such as a border, using pencil and small writing (initials and an abbreviated date, i.e., 11-13-51 are satisfactory). Notes should be made and the Laboratory advised as to the location of these markings and the source of the document. No writing should be done which will cover other written matter on the document. Care should be exercised so as not to write on the back side of a document where writing appears in the same location on the front side as this may interfere with examinations. Original documents should be mailed flat in a protective cover with an additional cardboard protection on both sides. It is generally advisable to send original documents by registered mail.

"Collected," and "Request" or "Dictated" Standards

There are two types of written standards; one is known as a "collected" standard and it includes writings done normally every day. The following list is given as a suggestion of some of the

many sources in which this type of standard may be found: Business and personal letters, canceled checks, many forms of receipts requiring handwriting, applications, tax forms, bank accounts, utility company records, automobile record files, Veterans Administration records, military records, school records and school work, voting registration forms, insurance forms, police records, library cards, fraternal and religious organization records, medical records, telegraph forms, charge account signatures, legal transactions, permits, diaries, etc.

The second type of standard is called a "request" or "dictated" standard. This type is written specifically for purposes of comparison. It is properly written from dictation by the requesting agency. The remainder of this section is concerned with the text, amount of writing, and the procedure to be followed for this particular type of standard.

What is to be written and the method to be used to obtain this request type of exemplar cannot be stressed too strongly. A suspect may agree to write for one or several reasons. He may be innocent and have nothing to fear, or he may be guilty and be afraid to refuse, due to the obvious implication. He may believe himself capable of disguising his handwriting sufficiently to thwart any complicity. He may also believe it is not possible to identify a person by his handwriting.

The suspect's reason, whatever it may be, is secondary to the fact that he has agreed to write. If for some reason the standards are not proper for purposes of comparison or are so obtained as to be objectionable when offered in evidence, the case may be lost if it is entirely on the handwriting evidence.

The underlying principle in obtaining handwritten standard exemplars is to duplicate the questioned writing in materials and conditions as much as is practicable. The materials to be used for the written standards are important and should be carefully considered. If the disputed writing was done with pen and ink, by all means use pen and ink for most of the standard writing. Do not substitute a ball point pen for the conventional type, but by the same token be sure to use a ball point pen when the questioned writing was made by an instrument of that type. Where any doubt exists, use both types of pen and label accordingly.

The Proper Taking of "Dictated" Standards

It is important that the suspect not be shown the questioned document prior to taking the standards from him, as he may then more easily attempt disguise or be otherwise influenced. The text of the material to be written in request standards varies, depending on the material being questioned. Also, this depends upon whether it is detrimental to the case for the suspect to know the content of

the questioned writing. In some instances the questioned writing may be dictated directly, as the subject already will know why he is being requested to write, and this is usually the most satisfactory comparison material, because this writing contains the same words and letter combinations that must be compared. Other instances may require that the subject, for some reason, not be told what the text of the questioned writing is, and in those cases other techniques are used. Two general plans are usually considered. In the first, the subject may be requested to write entirely unrelated words so as to obtain a sample of his writing, usually calculated to cover all of the letters of the alphabet, both small and capitals, along with numerals and common short words.[2] The following is a sample paragraph, as suggested by Osborn:[3]

> "Our London business is good, but Vienna and Berlin are quiet. Mr. D. Lloyd has gone to Switzerland and I hope for good news. He will be there for a week at 1496 Zermott St. and then goes to Turin and Rome and will join Col. Parry and arrive at Athens, Greece, Nov. 27 or Dec. 2. Letters there should be addressed: King James Blvd. 3580. We expect Chas. E. Fuller Tuesday. Dr. L. McQuaid and Robt. Unger, Esq., left on the 'Y.X.' Express tonight."

A second paragraph of the same general type, also suggested by Osborn, is included here for variation.

> "Dear Sam:
>
> "From Egypt we went to Italy and then took a trip through Germany, Holland and England. We enjoyed it all but Rome and London most. In Berlin we met Mr. John O. Young, of Messrs. Tackico & Co., on his way to Vienna. His address there is 1497 Upper Zeiss Str., care of Dr. Quincy W. Long. Friday the 18th we join C. N. Mazet, Esq., and leave at 6:30 A.M. for Paris on the 'Q.X.' express, and on the 25th of July sail for home on the S.S. King.
>
> "Very sincerely yours."

A more natural writing may be obtained by having the suspect write out in longhand the answers to questions put to him by the investigating officers. In this type of exemplar the suspect is usually concentrating more on the answer and less on the handwriting.

In the second type of approach to the request standard the subject is requested to write words and repeat letter combinations

---

[2] This form of standard is generally considered the most unsatisfactory for comparative purposes because it is unfamiliar and does not result in a free and naturally written specimen.

[3] Questioned Documents, p. 34.

occurring in the questioned material.[4] An elementary example is as follows: Where the questioned writing was "William Johnson," the following sentences should give comparable material:

1. John has a son named William.

2. I am willing to go. Or: Will you go with me?

3. John Williams is dead.

4. Johnson & Johnson Company make bandages, etc.

The Number of Request Standards Needed Varies

Numerically the quantity of request standard writing required varies with the different types of questioned documents involved. Basically, enough standard writing is needed to allow the document examiner to determine the normal writing characteristics of the suspect, along with his normal variation. Actually the number of standards is not the important point, but rather what is contained therein. With that thought in mind, the following suggested number of standards are given:

In cases involving questioned signatures, 10 to 25 proper standards are recommended. If disguise has been used in the questioned signature, this may not be enough, but that will be determined by the document examiner. In a case where there is more than just a signature involved, as in a questioned check wherein the entire face is in question, 5 to 15 exemplars are recommended. Finally, in the situation where the questioned writing consists of a page of handwriting, it is recommended that from 1 to 3 pages of the material be obtained as standard exemplars. When hand printing is under question, the same amount should be obtained as when hand writing is concerned.

In determining the number of collected standards to obtain, the general rule of submitting all material should be followed. As a practical matter, too many proper standards is quite unheard of.

Procedure for Taking Request Standards

The following is a suggested procedure outlined to follow when taking request standards:

1. The preliminary work in preparation to the actual writing. It will include gathering the necessary writing materials, deciding on the text to be written, arranging time and place for witnesses, and, if possible, obtaining collected standards to have available. The suspect should not be shown the questioned writing prior to taking written standards.

[4] Ordway Hilton in Journal of Criminal Law & Criminology, July-August, 1942, mentions that good results are obtained by this method.

2. Have the subject seated comfortably at a desk or writing table and explain what is desired.

3. Furnish paper similar in size, color, quality, and format (if questioned document has lines, furnish lines; if not, do not furnish lines). The writing instrument should be carefully chosen. If a pencil was used, of course furnish the subject with a pencil, try to duplicate the hardness, etc. If a ball point pen was used, be sure to use the same type of instrument. It is good practice to have available other materials to be used in obtaining additional material by varying the conditions slightly, as changing writing instrument, inks, papers, etc.

4. Dictate the material to be written, giving no aid in spelling, form, or punctuation. Do not allow subject to see the writing on the questioned document. Remove each specimen after completion and number each one serially, date it, and have the witnesses sign it. Repeat the same procedure until the required material has been obtained. Have the subject repeat the dictated material at least three times, using the same materials but on separate pieces of paper. If it is suspected that the subject is attempting to disguise his standards, continue the dictation until more than the recommended number of standards are obtained, and, finally, speed up the dictation, as it is difficult to maintain successfully a consistent disguise at an increased rate of writing.

6. Have the subject attempt to write with his other hand and take samples from both hands if he is ambidextrous. If genuine difficulty is encountered, stop the dictation but submit the sample anyway.

7. If it is known that the questioned writing was executed in an unusual position, take corresponding standards after completion of the normal position standards.

8. Obtain the following information from the subject: (a) date and place of birth; (b) place and extent of schooling; (c) condition of health; and (d) right- or left-handedness or ambidextrousness.

Overcoming Attempts to Disguise Writing

There may be several factors that will affect request standards, the most important of which is the attempt on the part of the subject to disguise his writing. As previously stated, more specimens should be obtained when disguise is suspected and increased speed of dictation sometimes assists in breaking up attempted disguises. Another method used is to confront the subject with collected standards showing his normal handwriting.

A counterpart to the above occurs when disguise has been used in the questioned writing, and in this instance it is sometimes not possible to obtain adequate standards on which to base an opinion. However, extensive exemplars should be taken and the question left up to the document examiner as to whether adequate material has been obtained. After normal standards have been taken, it is permissible to request the subject to write back-hand or smaller or larger in order to duplicate more closely the type of writing being compared. However, it is very important that a notation be made so that the document examiner is aware that the writer was so instructed.

When a subject is apparently using disguise in executing request standards and where it is practical, standards may be taken on different days because this sometimes helps to break down the consistency in the disguise.

Hand printing is just as individualistic as handwritten script and where the questioned writing is hand printed, the subject should be requested to hand print his standards. Care should be taken in obtaining hand printed standards as the suspect may use all capitals, whereas lower case letters may have been used in the questioned writing, and the two would not necessarily be comparable. After some preliminary hand printing standards are obtained, the subject should be instructed to hand print according to the desired form, again advising the Laboratory of these instructions.

Summary of Procedure

Due to the importance of taking the request standards properly, a brief resumé is given here of the suggested outline:

1. Have the subject seated comfortably at a writing table.

2. Furnish him with materials similar to those used in the questioned writing.

3. Dictate the material to be written; give no assistance; and do not allow the subject to see the questioned writing before the standards are written.

4. Remove each paper from sight upon completion.

5. Observe all writing and attempts at disguise.

6. Test the "handedness" of the subject.

7. Obtain personal data and be able to prove standards in court with witnesses.

A form of request standard frequently submitted which is poor in value is that in which the subject signs his name several times on the same piece of paper, one directly under the other. This

method offers ample opportunity to copy and greatly assists attempts at disguise. The use of separate pieces of paper is recommended, with each removed from sight upon completion.

No standards should be submitted to the document examiner whose authorship cannot be proven in court.

A fact not often taken into consideration is that in cases where a very limited amount of questioned writing is available, as in a signature, and where disguise has been used, it is sometimes impossible for the document examiner to express a definite opinion. Another side of this same question arises when the standards do not contain enough characteristics upon which to base an opinion. Occasionally a situation develops where although it is apparent that the suspect is the author, it would not be advisable to submit the case to a jury because of insufficient evidence.

HANDWRITING STANDARDS FOR BOGUS AND QUESTIONED CHECK COMPARISONS

Due to the frequency with which this type of examination is sought, it is deemed advisable to treat this subject separately. However, "checks" are no different than other documents. The same objectives pertaining to standards are true. Get all the available "collected" standards,[1] and with "request" or "dictated" standards[2] try to duplicate the conditions and materials used in the questioned check.

There may be some misunderstanding of the terminology used in reference to parts of a check, so the following labeled facsimile has been prepared to clarify the terms used here:

(PAYEE'S SIGNATURE) (1ST ENDORSEMENT)	MADISON, WIS. (DATE LINE) 19
	THE FIRST NATIONAL BANK 79-46/715 (TRANSIT) (NUMBER)
(2ND ENDORSEMENT)	PAYABLE TO (PAYEE) $
	(WRITTEN AMOUNT LINE) DOLLARS
(BACK OF SAMPLE CHECK)	(PAYOR'S SIGNATURE) (OR "MAKER")

(FACE OF SAMPLE CHECK)

Number of Standards Required

In the investigation of a bogus check[3] the entire check may be under question or only a small portion, as in a forged endorsement. Due

[1] Collected standards are those written in the daily routine of business and personal life, such as canceled checks and signatures occurring in a great variety of documents.

[2] Request or dictated standards are handwritten specimens written specifically for comparison purposes at the request of the investigating agency. They are written from dictation.

[3] A general term used to denote the many types of worthless checks including those based on no-accounts, fictitious accounts or names, insufficient funds or forged and altered signatures.

to the very limited amount of questioned writing in the latter case, it is necessary to request larger numbers of standards than when the entire check has been written by one writer. The following figures are given only as a guide and usually represent a minimum of material required. Where it is suspected that disguise has been used, more standards should be requested or collected. In the case where the handwriting of the entire check is under question, 5 to 10 exemplars may be sufficient. When only a signature is involved, more standards, from 10 to 15, may be required. These figures are for "request" standards. When "collected" standards are found, a representative sample of 25 should be satisfactory. Too much standard writing is a rarity. As with other types of request standards, it is desirable that the text of the material to be written duplicates the exact words and letter combinations with which the standard is to be compared. Unless there is a very definite reason to the contrary, the suspect should be requested to write the exact words and numbers that appear on the questioned check. If this is not possible, combinations of words can usually be grouped so as to accomplish essentially the same objective.

The suspect should be furnished a writing instrument which duplicates, as nearly as possible, the kind of instrument used to write the questioned material. He should also be furnished blank checks similar to the questioned check or else a good quality white bond paper of the same size as the original check. If the questioned writing was done in pencil, use a pencil for the standard writing; and if a ball point pen was used, furnish the same type of instrument--the same applies to conventional pens.

Procedure for Taking Standards

The following is a suggested procedure for taking proper "dictated" standards:

1. Have the subject seated comfortably at a writing table.
2. Furnish the necessary materials and explain what is desired.
3. Dictate the material to be written; and this is very important, do not allow the suspect to see the writing on the questioned document. Do not give any assistance in spelling, punctuation, or form.
4. Remove each completed specimen from sight, and repeat the dictation until the desired number of standards have been written. Each specimen should be numbered as it is completed, dated, and marked for identification by the witnesses.
5. Have the subject attempt to write with his other hand and take standards from both hands if he is ambidextrous.

6. Note the following data regarding this subject and include it with the exemplars:

   a. Name, sex, date and place of birth

   b. Place and extent of education

   c. Condition of health, and any handicaps

   d. Right-or left-handedness, or ambidextrousness

If hand printing was used on the questioned document, instructions should be given to hand print the standards. When the questioned writing is all in capital letters, care should be taken to request all capitals, and lower case when lower case letters are used.One form of unsatisfactory standard frequently submitted is a piece of paper containing a column of signatures, one below the other. This form gives the writer opportunity both to use disguise and then to copy it.

No standards should be submitted to the document examiner unless they can definitely be proven in court to have been written by the purported author.

Since it is always desirable for the document examiner to examine the original questioned document, whenever it is possible the original should be submitted. If it is necessary that the original be returned, the document examiner can make a scaled photograph for further comparative work. Photostats are not desirable for the comparison of handwriting because they are sometimes unsatisfactory.

The Handling of Writing and Printing Devices

In the event that a checkwriter,[4] typewriter, rubber stamp, or printing has been used on the questioned check, samples from any suspected writing or printing devices should be obtained and submitted, as it is often possible to connect a specific machine to a given specimen of work.

In the case of a typewriter, the following should be submitted: A complete sample of the keyboard in both upper and lower case positions, the make, model, and serial number, in addition to specimens duplicating the same material used on the questioned check.

[4] A checkwriter is a machine used to print the dollar amount on the check. It is commonly referred to as a check protector, but actually a check protector is an accessory to a checkwriter. A check protector perforates the payee and sometimes the amount.

A suspected checkwriter or check protector should be sampled in the same manner, and the machine sent to the Laboratory whenever possible.

A rubber stamp and stamp pad should be submitted directly to the Laboratory for proper sampling and photographic processing.

Occasionally a suspect is found to have a small printing press in his car, or in his possession, or at least there is a suspicion that he has used it. It is suggested that the press, if portable, be made available to the Laboratory for the most expedient examination.

When a suspected numbering machine is found, it should be sent to the Laboratory along with the questioned material.

Questioned writing instruments, such as pens and pencils, and materials such as ink and blotters, may also be compared and examined. They should not be overlooked.

When there is a doubt as to the proper procedure do not hesitate to send the article to the Laboratory.

STANDARDS OTHER THAN HANDWRITTEN

The examination of questioned documents often requires standards other than handwritten exemplars. Some of these standards have been mentioned in connection with the bogus check discussion. There are two general categories: the writing or printing instrument used, such as a pen, rubber stamp, or typewriter; and the materials used, such as ink, paper, or stamp pads. Sometimes it is possible to connect this type of material directly with questioned material, as in a situation where the questioned document has a torn edge which can be successfully matched with the paper found in the suspect's possession. Usually the proof is indirect or corroborative, such as in a situation where the same type of ink used on the questioned document is found in the suspect's possession, etc.

In these types of standards, all of the standard instruments or materials should be obtained. For instance, if it is suspected that a typewriter was the machine used to execute the questioned typewriting, it should be recovered for sampling purposes so that it will not be changed or damaged or even disposed of by the suspect. Any of the following should be taken in toto as standard samples when they may have been used in part of the preparation of the suspected document: a ball point pen, a pencil, a crayon, a bottle of ink, a writing tablet, a partial sheet of postage stamps, a newspaper or magazine which may have been used for cut out letters in an anonymous letter, a blotter, a bottle of glue, a pair of scissors, or scotch tape. To obtain standard samples to submit to the document examiner in cases involving a questioned typewriter, check writer, numbering machine, or rubber stamp, it is usually necessary only to take complete specimens of the entire keyboard or printing faces, along with duplications of the actual questioned material and, in addition, such descriptive data about the instrument which will serve to identify it, that is, name, model, serial number, etc. In cases of the other miscellaneous types of standards, it is usually advisable to submit them for direct comparisons. They, of course, should be accompanied by information as to their suspected relation to the questioned document and marked for future identification.

Blotter Transfers, Indented Writing, Laundry Marks, etc.

Mention is made here of a few possibilities pertaining to the last category of standards. When inked writing is blotted immediately after writing, some of the ink is transferred to the blotter. At times this transfer can be made legible by use of a mirror, ultraviolet light, photography, and chemical treatment.

Indented writing occurs when a second piece of paper is under the paper being written or typed on and, due to the pressure of the writing instrument, is impressed when the pressure is great enough. This type of writing may be developed in several ways. It is necessary to protect this type of document by padding with a protective cardboard in mailing.

Paper can reveal valuable information when properly examined. Identification of water marks may prove useful. It is possible physically to match torn edges. Tablet paper can be matched by the paper cutter markings on the edges of the sheet. Fiber identification is also sometimes used in paper comparisons.

It is possible to differentiate various types of inks by chemical tests. Generally speaking, it is very difficult to state the age of ink writing. It is often possible to restore certain ink writing that has been eradicated or obliterated.

In some instances typewriter ribbon threads can be counted and used as a corroborative factor.

Charred or burned documents are valuable evidence and must be specially handled. Protect them from winds and drafts and do not attempt to handle. Contact the Laboratory for assistance. It is possible to decipher them under certain conditions.

Documents containing erasures and/or alterations and those suspected of containing secret or invisible writing should be sent to the Laboratory for proper processing.

Laundry and cleaning marks represent a specialized type of document and frequently reveal valuable information to the investigator. Some of these marks are put on with special ink that is invisible to the naked eye and must be developed by the use of ultraviolet light. Material suspected of this type of marking should be sent to the Laboratory for processing.

FINGERPRINTS

Law enforcement agencies in Wisconsin that have fingerprint evidence to process and are without facilities to do it may send that evidence to the Wisconsin State Crime Laboratory for processing. Currently the Laboratory is not able to send fingerprint technicians into the field to process for latent fingerprints except in cases of major crimes.

Preservation of evidence to be processed for latent fingerprints[1] cannot be stressed too strongly. Before fingerprint evidence is sent to the Laboratory it is recommended that a scaled photograph[2] be made showing its relationship to the crime scene. It is also recommended that a scaled photograph be made of the developed latent fingerprint prior to attempting to "lift"[3] the developed "print." The evidence should be marked before it is sent to the Laboratory so that it can unmistakably be identified at a later date. This marking should be in such a place and in such a manner that it will not destroy undeveloped latent fingerprints. Usually initials and a short form of date are sufficient, if proper notes are kept by the submitting agency. When fingerprint evidence is submitted to the Laboratory it should always be accompanied by a case referral sheet. See Part I for a sample case referral sheet. If a copy of the case referral sheet is not available, be sure to send at least the equivalent information.

If scaled photographs have been made by the submitting agency, a copy of these should also accompany the evidence.

When it is known that certain persons have handled fingerprint evidence that is being submitted, it is recommended that their names and fingerprint cards be submitted along with the evidence for elimination purposes. When fingerprint evidence is to be transported to the Laboratory, there are two avenues available; one is to mail it

---

1 The term "latent fingerprints," as discussed in identification work, refers to finger impressions, either visible or invisible, and smudged or clear. They are usually found as partial fingerprints.

2 A scaled photograph is one in which a scale or ruler is shown so that the size relationship of the image in the picture to that of the original object can be determined. To do this properly, the scale and image (latent fingerprint, for example) must be in the same plane and at right angles to the axis of the camera. This same plane must be parallel to the plane of the film.

3 A developed latent fingerprint is frequently "lifted" from the object on which it was developed and then placed on a more usable medium such as a piece of clear glass or clear celluloid film. This lifting process is usually done with a clear-type of scotch tape. Another medium used for lifting is a rubber material similar to a tire patch, but this necessarily requires rephotographing as the lift, when made, is reversed from left to right.

in, and the other is to bring it in. In either case the objective is the same, namely, to transport the material to the Laboratory and not to destroy or damage the evidential value of the latent fingerprint. Transporting evidence in a car may be accomplished by placing the material on a hard surface and securing it so that it will not slide or shift, and thereby rub off possible latent fingerprints. It is strongly recommended that no soft material, such as cloth or cotton, be placed next to the surface suspected of containing latent fingerprints. If the fingerprint evidence is mailed to the Laboratory, the following general principles should be observed: secure the evidence so that it will not shift during mailing; allow for a minimum amount of contact between surfaces containing potential fingerprint evidence and the other surfaces. When evidence to be processed for fingerprints is handled, common sense is all that is needed. The use of a handkerchief or soft material is not recommended, as it gives the user a false security and frequently damages potential latent fingerprints. Fingerprint evidence should be handled only when absolutely necessary, and then in such a manner as to minimize possible contamination or damage of potential latent material. Again, all those known to have handled the evidence should be noted, and their fingerprint cards supplied with the material.

In an attempt to be more specific about the very numerous items on which latent fingerprints are found, this topic will be discussed under general group headings.

Crime Scene - Outside of Building

Normally, the point of entry should be examined first. Windows, window sills, doors, and door jambs can be processed satisfactorily using fingerprint powder if the surfaces are dry. The preservation of this material consists mainly in keeping the curious public and victims away from the point of entry. Usually, this type of evidence, due to its bulk or permanence, is not transported to the Laboratory, but this is not discouraged if warranted. There may be occasion to saw out a piece of wood in order to preserve the evidence contained thereon, and it is strongly recommended that a scaled photograph be made of this area before the cutting is started. When material of this sort is transported in an automobile in lieu of mailing, it should be so placed that the surfaces to be examined do not come in contact with any other material during the trip.

Crime Scene - Inside of Building

After the point of entry has been processed, the object(s) attacked or known to have been handled by an intruder should be examined. This material will be discussed under separate headings. Examination of the woodwork inside the house may show where a burglar "felt" his way through the building in the dark.

Safes, Cash Registers, and Money Boxes

Items of this nature can be brought by automobile to the Laboratory for processing, thus eliminating the necessity of crating or packing with the attendant hazards of destroying "latent" possibilities. Money boxes are usually small enough to be considered for mailing to the Laboratory. This raises the problem of packing the money box carefully, and yet preserving the outside surface for latent fingerprint examination. One method used for this type of problem was to wire the money box to the bottom of the box being used to send the material to the Laboratory. Obviously there are many ways that will work successfully. If specific questions come up, the Laboratory may be able to assist the requesting agency by offering suggestions.

Guns, Knives, and Tools

When items of this category are important enough to be brought to the Laboratory by car, care should be exercised in how they are carried. They should be secured rigidly so that the surfaces to be examined will not be damaged. If one considers the fragile nature of latent fingerprints, it is not difficult to realize how little wiping is necessary to remove completely this type of evidence. Guns, for safety reasons, should be unloaded with great care in order to prevent more than a minimum of damage to latent prints. Postal regulations require that guns and ammunition be sent by express and not through the mails.

Paper

Paper to be examined for latent fingerprints should be sent to the Laboratory immediately, as time is an important element in successfully developing latents on this medium. Because of the poor results produced with the use of powders, they are not generally recommended. Facilities are available at the Laboratory to process paper by various chemical methods. Paper should be placed in a protective envelope to prevent further handling. If marking is considered necessary, it should be done very lightly with pencil, as marking may cover a latent print.

Glass

Glass (window, drinking, bottle, etc.) offers one of the best possibilities for latents due to the ideal surface. This type of evidence can be successfully handled if only the edges are touched. Marking is difficult and may be put off until after the processing, if needed at all. By the use of signed receipts the chain of possession can be maintained. The transportation of this type of evidence to the Laboratory by mail calls for careful packing to prevent movement or undue contact with other surfaces. This can be accomplished in the case of glasses and bottles by using a small wooden rack.

Automobiles

It is necessary either to have the fingerprint technician go to the car or have the car towed or driven to a place where it may be processed. It is necessary for the person driving or towing the car to use extreme caution is preserving all possible surfaces that may later be examined for latent fingerprints, especially inside the car. Before the car is processed for latent fingerprints, it is very important for the fingerprint technician to be furnished with information relative to the method by which the car may have been attacked. For instance, if the car was locked at the time it was broken into, the point of entry would be very important. If the car was unlocked and driven away, such things as the no-draft window and rearview mirror may have been adjusted. The ignition key, steering wheel, and gear shift lever should be examined also, as well as the dashboard, glove compartment and other surfaces. When it is known that the trunk was opened, that area should be examined.

Palm-and Footprints

Occasionally palmprints are developed from latent impressions and then a request is made to submit palmprints for suspects. The Wisconsin Law Enforcement Bulletin for July 1950 includes a discussion of the use of palmprints.

It is unusual for barefeet impressions to be found at crime scenes, but they contain ridge patterns similar to fingers and palms. If found, they can be used for positive identification just as finger impressions.

Fingerprinting of Unidentified Bodies

Unidentified bodies present problems in fingerprinting. When a dead body is fingerprinted, the fingers are inked by use of a roller or special inking pad. The paper is cut in strips, one for each finger, and cupped around the finger and pressed to it. Much care must be exercised in order that no error is made in labeling the separate pieces of paper containing the prints.

When the body is decomposed, it is sometimes necessary to cut off the fingers and place them in separate labeled jars containing a preservative. These can then be sent to the Laboratory for examination. Occasionally, when only fragments of the finger skin remain, the same procedure as just outlined is followed. Much care is necessary in handling this decomposed material as it is very fragile sometimes. When the outer layer of skin is gone, the under layer may still be used, since it contains the same ridge patterns.

Comparison of Latent Prints and Suspect Cards

When latent fingerprints are developed, they are preserved at the Laboratory until fingerprint cards for the suspect(s) are received. Comparison of latents with the suspects' fingerprint card

frequently is made difficult or impossible, because the fingerprint cards submitted were carelessly or improperly taken. The clearest possible card should be sent in for comparison purposes. The rolled impression should be as complete as possible.

When an identification is made through latents and the results are needed in presenting the case to court, arrangements for the preparation of exhibits and scheduling of the technician to testify should be made as early as possible.

BIBLIOGRAPHY

Books

Battley, H. - Single Finger Prints, Yale University Press, 1947.

Bridges, B. C. - Practical Fingerprinting, Funk & Wagnalls Co., 1942. (See especially, Chap. XIX, Court decisions).

Chapel, Chas. Edw. - Fingerprinting, A Manual of Identification, Coward McCann Inc., 1941.

Cummins & Midlo - Finger Prints, Palms & Soles, Blakiston Co., 1943.

Henry, Sir E. R. - Classification & Uses of Finger Prints (Eighth Ed.), His Majesty's Stationery Office, London, 1937 (historic interest).

Hoover, J. Edgar- Classification of Fingerprints, U. S. Government Printing Office, Washington, 1939.

Inbau, F. -"Self Incrimination, what can the accused person be compelled to do?" in Fingerprints,-C. C. Thomas, 1950

Kuhne, F. - Fingerprint Instructor, Munn & Co., 1941.

Scott, Chas C. - Photographic Evidence, Preparation & Presentation, Vernon Law Book Co., Kansas City, Mo., 1942 (See especially, Chaps. X, p. 248-88, and XXI, p. 684-691, and case citations)

Scott, Walter R. - Fingerprint Mechanics, a Handbook, C. C. Thomas, 1951.

Sharp, Vaughn (Det. Sgt.) - Palm Prints, Their Classification & Identification, Mercantile-Atlas Printing Co., Cape Town, So. Africa, 1937.

Underhill, H. C. - Underhill's Criminal Evidence (4th Ed.) (Niblack), Bobbs-Merrill Co., 1935.

Wentworth-Wilder - Personal Identification, (2nd Ed.), Finger Print Publishing Co., Chicago, 1932.

Wilton, Geo. W. Fingerprints: History, Law & Romance, Wm. Hodge & Co., Ltd., London, 1938.

Periodicals

Journal of Criminal Law & Criminology:

3:2:148 - Fingerprints admissible as evidence

25:3:500-17 - Palmprints and fingerprints by Fred Inbau

26:4:587, 594 - Proof of fingerprints by Albert S. Osborn

27:1:117 - Fingerprints afford "surest method known" for identification purposes

27:1:122 - Identification by palm prints

27:1:122 - Identification by footprints

27:1:122 - Convictions based on palm prints

27:4:600 - Proof necessary to introduction of fingerprint card

28:2:273 - What can an accused person be compelled to do? by Fred Inbau

31:5:653 - Inadmissibility of fingerprint card bearing previous criminal history of the accused

32:1:126 - Is fingerprint identification sufficient to support a conviction for a criminal offense?

32:5:594 - Fingerprints sole evidence in burglary conviction

37(1947) 511 - Compulsory fingerprinting and the self-incrimination privilege by Seder

38:4:440 - Dissemination of fingerprints before conviction as an invasion of the right of privacy

39:1:128 - Fingerprints at scene of crime not conclusive proof of guilt

40:6:809 Fingerprint evidence - number of points required

F. B. I Law Enforcement Bulletin:

September 1940, pp. 37-46, Value of palm prints and method of taking

August 1942, pp. 13-17, Transmittal of evidence for latent finger print examination

July 1946, p. 28, Admission of fingerprints as evidence

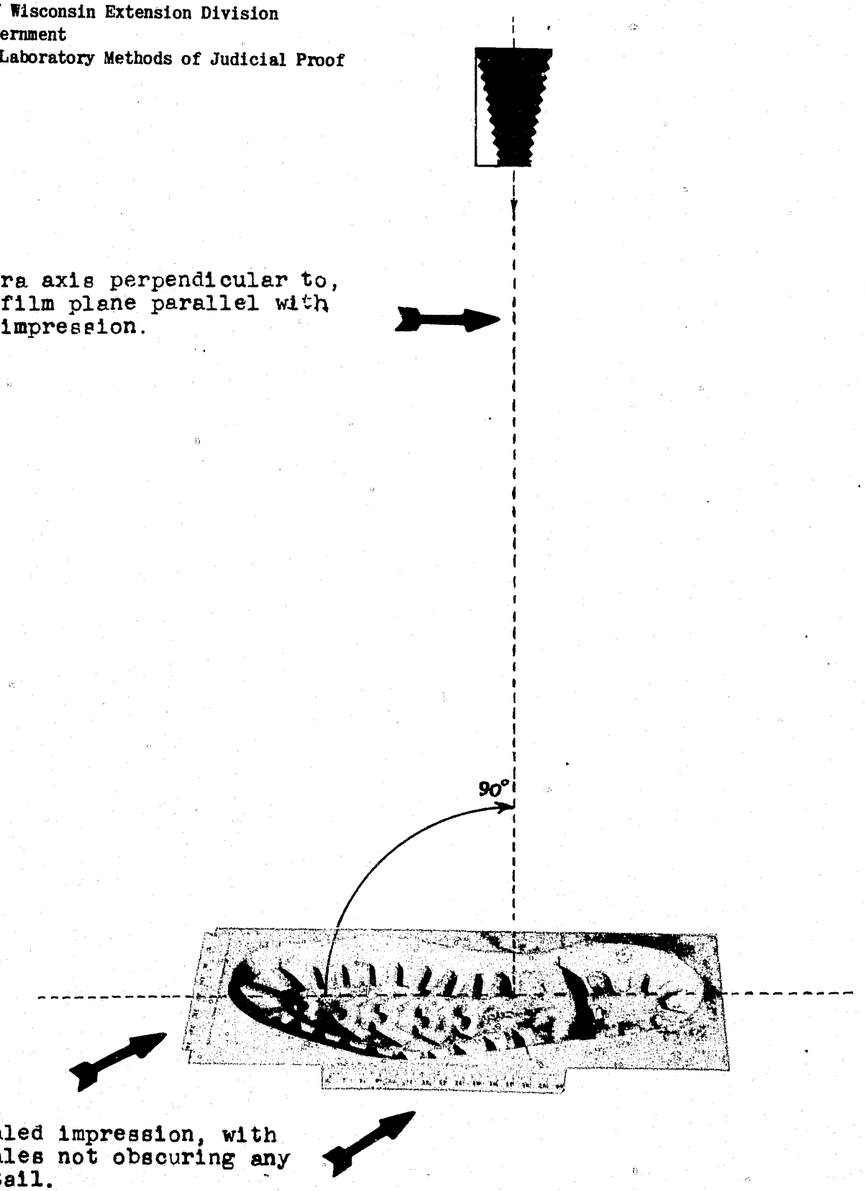
Police Journal: January-March 1941, p. 30, Palm prints as evidence of identity by D. Grant

Wisconsin Law Enforcement Bulletin: July 1950, Palm prints

Finger Print & Identification, issued monthly by Institute of Applied Science, Chicago

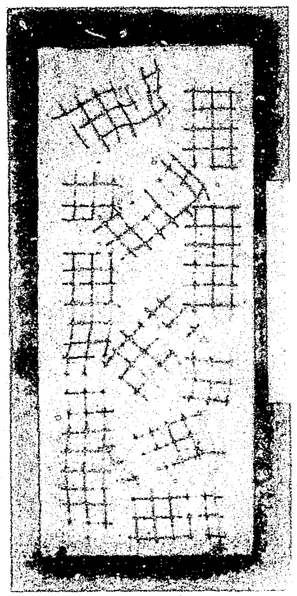
Fig. 45 PHOTOGRAPHING THE IMPRESSION

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

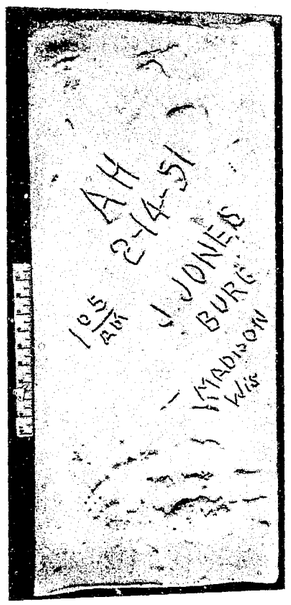


Source: Wisconsin State Crime Laboratory.

FIGURE 46
REPRODUCTION OF IMPRESSIONS BY CASTING



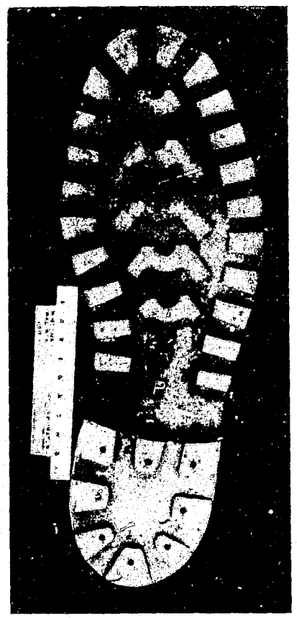
a. Reinforcing the Cast.



b. Marking the Cast.

c. The Negative Cast.

d. Positive Cast.



e. Shoe which made the Impression.

Source: Wisconsin State Crime Laboratory

University of Wisconsin Extension Division
Bureau of Government
Institute on Laboratory Methods of Judicial Proof

INTERVIEWING WITNESSES

John Kennedy

What does "Interviewing Witnesses" mean? Interview is defined as "A meeting face to face, a conference, a meeting between a member of the press and another person to enable the former to get information for publication."

Witness is defined as "One, as a beholder, who has knowledge of anything."

Interviewing witnesses will be discussed for the purpose of this paper as "having a face-to-face meeting with persons who have personal knowledge of certain facts, in order to get information about those facts."

Before one can question witnesses they must be located. Usually the interviewer is not too concerned with this problem. However, the missing witness is more often than not, an important or vital witness. Therefore, a portion of this paper will be devoted to the subject of locating witnesses.

To locate witnesses:

Compile all the known facts pertaining to the missing witness.

1. Get his complete description. This should include, if available, full name, aliases, age, birth date and place, race, nationality, height, weight, color of eyes, hair and complexion, scars, marks or other physical defects or peculiarities, general appearance, mannerisms, posture, disposition, style of dressing, clothing sizes, personality, teeth chart or bridges, and fingerprint classification. Obtain a photo and a fingerprint chart, if available.

2. Develop his family history. This should include his last known address, previous addresses, and length of stay at each. List street and number, city, state and county, his marital status, dates and places of marriages and divorces, names, addresses, and ages of children and spouses, their kinds and places of employment, as well as names and addresses of other relatives and friends.

Paper presented at the Seventh Annual Seminar and Training Course in Arson Detection and Investigation, Purdue University, Lafayette, Indiana, April, 1951. Reproduced by permission of Mutual Investigation Bureau, Chicago, Illinois, who originally privately published this paper.

3. Check his education. Find out the schools attended, their locations, kinds or types of schools, dates of attendance, degrees conferred; his membership in school societies, fraternities or clubs; special awards, scholarships or honors conferred, abilities, likes, dislikes, and disciplinary action taken.

4. Check his employment. Include dates of employment, places, types of work performed, names and addresses of employers and supervisors, reasons for leaving, and salaries.

5. Check his military history. Include dates of service, place and organization or branch of service, rank or rating, type of discharge, where entered service, where discharged, any service-connected disabilities, medical record in service, conduct record in service, and membership in reserve group.

6. Develop his background. Find out his hobbies, habits, trades or professions, unions or guilds, fraternal or religious affiliations, skills, any criminal record and if so, crimes committed and modus operandi, his eating habits and favorite foods, preference in hotels, any special medicines used, or artificial aids used, banking connections, type or kind of amusement places frequented.

7. List his possessions. Type, make, and kind of automobile, full description and location of property owned, stocks, land and life insurance owned, pensions or income received, creditors.

These facts may be obtained from the following: employment records, charge account records at department stores or local merchants where the missing witness is known, arrest records, school records or yearbooks, athletic team records, court records, photo studios, military records, doctor's and dentist's records, hospital records, friends, relatives, acquaintances, teachers, employers and past employers, military authorities and police.

The Search for Witnesses

After all the known facts available about the missing witness have been compiled, an organized search is begun. The procedure of the search will vary in each case according to the facts and information peculiar to the witness. Some suggestions for searching are listed here:

1. Interview the neighbors at his last known address. They may have helped him move, observed who moved him, or heard him mention where he was going. He may have told some of them where to forward messages.

2. Work with the Post Office Inspector and the local mail carriers. They may be able to provide a forwarding address. They may be able to place a "mail cover" on the homes of friends and relatives to whom he may write and thus establish his present whereabouts when the circumstances warrant, and this is not against the law.

3. Check to see if he provided a forwarding address for his newspaper and magazine subscriptions.

4. Send telegrams to him in care of his friends and relatives; they may decide it is important and give the Western Union operator a forwarding address when they would not give it to an investigator.

5. Place a person-to-person long distance call to the missing witness at his last known number from another town, and provide the telephone operator with the phone numbers of his friends and relatives as alternate numbers where he might be reached. If he is at one of the numbers called, he may take the call, thinking it is a friend.

6. When the missing witness owns a car, work with the various state boards of motor vehicles. Also work with the automobile finance company. They may be able to tell you from what city or town they received the last payment.

7. When physical aids or medicines are used by the missing witness, work with doctors and pharmacists. Pharmaceutical agencies often use control or register numbers in the manufacture and distribution of their products.

8. Check churches of the missing witness' faith.

9. Check utility companies to see if the missing witness was a customer of theirs. He may have transferred service or written in for a return of his deposit.

10. For his last address, check the polling lists of persons eligible to vote.

11. Check the unemployment compensation board and hiring halls of his union.

12. Exhibit the missing witness' photo to railway clerks, airport personnel, bus station personnel, hotel clerks and house detectives, waiters of restaurants where his favorite type food is served, and operators and employees of the types of places he likes to frequent

13. Make full use of telephone and city directories. Check the records of business firms with which the missing witness has done business.

14. Check military records, where possible, — many men are members of various reserve groups and must keep their service informed of their whereabouts.

15. Check local police records and also those in nearby places. Many missing witnesses run afoul of the law.

Grooming, Attire, and Manner of Interviewer

In interviewing witnesses:

The interviewer should give careful consideration to his appearance. He should avoid wearing "loud" or flashy clothing that will attract attention. Sport shirts and casual clothing usually are not recommended as they impart a "holiday" or "festive air" to an interview that is meant to be strictly business.

Diamond rings and jewelry worn by the interviewer may distract certain types of witnesses and suggest poor taste on the part of the interviewer.

Proper attire for the interviewer might be a well-pressed business suit of reserved design and color, a clean white shirt buttoned at the neck, a conservative four-in-hand tie with neat knot, well-polished shoes which blend with the ensemble, conservative socks, and a suitable hat.

Cleanliness is imperative for the investigator, both in clothing and personal habits. The fireman may be commended for his dirty face and clothing, which indicate hard work at the fire, but the investigator's appearance is one of the tools of his trade, and he should be clean and neat.

The investigator who instills a feeling of dislike into the person being interviewed makes his task doubly difficult and may defeat his purpose. When the interviewer has dirty fingernails, dirty face, or hands, soiled or disheveled clothing, needs a haircut, or is unshaven, the witness may find his attention straying to the unkempt features of the interviewer and involuntarily feel a sense of repugnance. This may not only distract the witness' attention but also create a mental barrier which will not be conducive to a good interview.

Women and juveniles are quick to observe these objectionable features of the interviewer and form quick but lasting opinions from these first impressions.

There is usually a tendency on the part of witnesses to get the interview over with as quickly as possible when they consider the interviewer to be dirty or unkempt. This is a natural feeling, and it is evident that the clean and neat interviewer has a decided advantage over one who is dirty, or who has objectionable habits.

A lack of consideration by the interviewer has somewhat the same effect on witnesses as the unclean or unkempt interviewer. This is usually nothing more than failure to observe common courtesies: tracking dirt into a witness' house, smoking without permission in the witness' home or office, loud and offensive language, a "blustery attitude," failure to remove hat, or other acts of rudeness. The interviewer can overcome these failings by being courteous.

The desirable background for an interviewer might include a knowledge of English composition and grammar, a knowledge of practical psychology, a knowledge of the laws of libel and slander, and a sympathetic understanding of human nature.

Some helpful qualities an interviewer should possess are: intelligence, a natural curiosity, persistence, a pleasing personality, and the powers of persuasion.

The necessary requisites for an interviewer are a knowledge of the situation about which the witness is being interviewed, the ability to enter into the interview without any preconceived ideas, and the ability to apply common sense principles to the situations evolving from the interview.

Before beginning the interview the investigator should be familiar with all the details of the investigation or situation pertaining to the interview. In this way he will be able to exploit conversational trends as they occur during the interview. I believe it is a more efficient procedure for an investigator or a team of investigators to follow through on the same investigation in spite of "working hours," "shifts," "vacations," "days off," etc. Of course, this is not always practicable, but when possible, the men most familiar with the case should conduct the interviewing of the witness.

So often a witness mentions a person, place, or thing which is of great significance only to the men who have been regularly working on the investigation, and they are able to quickly draw out the witness on this facet of the case. However, that same person, place, or thing when incidentally mentioned to an uninformed interviewer has no particular meaning and is not properly developed.

The interviewer must have an open mind. He must enter the interview without any preconceived ideas. This is of utmost importance. The interviewer must not have any preconceived ideas of what has happened, based on previous experience. He must also keep an open mind throughout the entire interview. However, this should not prevent the interviewer from being alert to detect inconsistencies or discrepancies in the witness' story.

The interviewer should have some knowledge of the laws of libel and slander. Every private person or organization engaged in the business of investigating the actions of other persons is subject to suit for libel and slander on the slightest provocation. As a matter of fact, suit may be brought without any real provocation, especially where extraneous facts offer an opportunity to build up a case by fabricating the essential elements.

For example: An arson investigator for private insurance companies suspects A of arson, but is never able to prove it. The investigator believes that B knows more than he has told about the fire. A and B are good friends. The investigator holds a private conversation with B in which he endeavors to find some holes in B's story while he carefully avoids making any accusations or derogatory statements. The investigator may be sued by A for slander and find that B is prepared to swear that in the private conversation the investigator stated flatly that A had burned his building to get the insurance money. The investigator cannot deny that the private conversation took place, so the case will go to the jury on the conflicting testimony as to what was said. It will be B's word against the investigator's before a jury composed of the townsmen or neighbors of A and B. If B is a reasonably convincing liar, A will more than likely win the case.

The illustration offers a number of points for consideration.

(1) It is slanderous to state that a man committed arson or any other crime, unless you can prove that he did.

(2) It is sufficient publication if the statement is heard by one person, other than the person about whom the statement is made.

(3) It is dangerous for an interviewer or investigator to be in a position in which only his own testimony will be available against the testimony of one or more hostile persons.

(4) Procedures for dealing with witnesses and suspects which are routine for police and law enforcement officers cannot be employed safely by private investigators.

Selecting the Place of Interview

Privacy is desirable during the interview for many reasons. It is conducive to concentration and clear thinking by all parties. A witness is more inclined to reveal confidences in privacy. The intrusion of undesirable and unwanted persons into the place where the interview is being held may have an adverse effect on the witness. He may lose his train of thought, become rattled and forget or fail to remember pertinent details or facts.

The place of the interview should be selected with consideration for its accessibility to a court reporter, polygraph, or other laboratory aids, if they are to be used in conjunction with the interview.

The nature of the interview and the person to be interviewed may affect the interviewer's decision of where to hold the interview. The place selected should not usually be distracting or upsetting.

An adult male witness might be interviewed in the jail, under certain circumstances, or the interviewer's hotel room. However, these places would probably be inappropriate for a female witness or a juvenile.

A schoolroom, the principal's office, or the juvenile officer's office might be ideal places to interview a juvenile, but might not be the correct setting for an adult male or a female witness.

A room in the courthouse or an office might be suitable for interviewing a woman, depending on the circumstances. However, in all cases it is usually better to get the witness away from his place of employment or his home, to a place where he can think freely and independently and where he will be on neutral ground.

If he is interviewed at work, the witness may attempt to hurry you so that he can go back to work before his boss comes along. He may also become embarrassed and flustered because he feels that his supervisors and co-workers are curious about what is going on, or he may be afraid that they think he is in some kind of difficulty.

When you interview the witness at his home, you may lose control of the interview. He will be in his own environment and will be self-confident and sure of himself. He may also be brief and misleading because he wants to terminate the interview before his family comes home. If they are present, he may feel that they are within hearing distance and he does not want them to hear what he has to say. He may also feel that the neighbors are aware of what is taking place and this may distract his attention. I believe the witness will be more inclined to take his time and go into detail if he is interviewed away from his home or place of employment.

Careful preparation should be given to the selection of the proper time to interview a witness. This decision depends on many factors. The working hours of the witness, his family routine, the purpose of the interview, and the ability to time one interview in order to complete it, and to interview certain other verifying witnesses before they can be contacted by the witness are all factors which must be weighed and considered before selecting a time for the interview.

The time of day or night is important to the psychological aspects of the interview. Women and juveniles present a particular problem with reference to the time they are interviewed. Except in rare and unusual cases, women and juveniles should not be interviewed in the late hours of the evening or very early morning hours.

The number of persons present during the interview of an adult male depends on the situation. Two co-interviewers seem to be the ideal number. This provides corroboration and protection for each of the interviewers, and if the witness changes his story, the preponderance of proof is on the side of the interviewers.

Witnesses should always be interviewed separately, and no witness should be present while another witness is being interviewed.

In an interview, efficiency is usually achieved in inverse proportion to the number of persons present during the interview. Too many interviewers disrupt and hinder the procurement of information.

I can think of no good reason for friends or representatives of the witness to be present during the interview of the adult male.

When interviewing a juvenile, the investigator should consider the advisability of having a juvenile officer, school principal, teacher, church representative, social worker, scoutmaster, or other suitable person, not including parents or relatives, present.

When interviewing a woman, the presence of another woman representing the interests of the interviewer is recommended. She may be employed as a stenographer or reporter.

Recording the Details of the Interview

Each interviewer has his own system of preserving or recording the details of the interview. Some trust to memory, others take brief notes, complete notes, written or typewritten signed statements with or without the aid of a stenographer or court reporter, wire, disk and tape recordings, and some use a combination of these methods. The important point is that the witness should not be frightened by the display of recording materials.

Some interviewers do not exhibit a paper, pencil or other recording instrument until they have heard the witness' entire story in fullest detail. Other interviewers get the witness talking and then casually and matter-of-factly begin taking notes.

Other interviewers begin taking a complete statement from the witness the moment the interview begins; they do it in such a way that the witness is soon reassured and is reacting in a cooperative, communicative manner.

Some witnesses will not respond as well when notes or a statement are being taken in their presence. They seem to become more careful of what they say when it is being recorded. However, with some witnesses this is an asset, as they are then more inclined to be accurate and truthful.

How to preserve the details of the interview is a problem that each interviewer must solve for himself, depending on the witness and the situation. When in doubt, get the full and complete facts from the witness and then face the problem of how to record it.

Certain preparation should be made before the interview begins. The interviewers should review the facts on what is known about the witness, what they believe the witness can tell them, what type of witness they believe he will be, and decide on their strategy. They should prepare some of the key questions they plan to ask.

They should also make tentative arrangements with the polygraph operator if there is a possibility that a test will be run during or after the interview. "Confronting" witnesses should be contacted and arrangements made to have them ready if they are to be used. Plans should be made ahead of time for the sending of spurious wires or telephone calls, or receipt of same in the witness' presence, if this type of trickery is to be employed.

The purpose of the interview is to obtain information from the witness. I usually think of the interview as a conversation, but a one-way conversation, with the interviewer saying as little as possible. The interview is <u>not</u> designed for the purpose of a mutual exchange of information.

Guiding the Interview

The investigator is supposed to interview the witness, however, too many times investigators impart more information than they receive. I believe the interviewer or investigator should do three things:

1. <u>Stimulate the conversation</u>. This is done, of course, by asking questions which are brief and cannot be answered by "yes" or "no." These questions should not convey any information but should

merely "stimulate" the flow of conversation from the witness. This procedure varies as to the type, disposition and situation of the witness, and each interviewer will conduct himself differently.

2. Guide the conversation into the proper channels. After the investigator has stimulated the conversation he must guide the trend of this conversation so that he will get full, complete, and detailed answers about facts and subjects in which he is interested. Witnesses must be carefully guided so that they do not ramble too much.

3. Corroborate the information furnished by the witness. Refer to previous information received pertaining to that particular fact or subject. Complete corroboration depends on getting the information in a detailed and specific form so that it can be corroborated by other statements, or by the same witness in his own statement. Getting the facts in this detailed and specific form will enable the interviewer to check the information received from the witness with that received from witnesses interviewed previously and from witnesses who will be interviewed later.

When misstatements, inaccuracies, untruths, or discrepancies occur during an interview, "hit" them again and again. This may be done by reparaphrasing the same questions and asking them in another form. The interviewer may also require the witness to give more detailed accounts of the information which produced the misstatements, untruths, discrepancies or inaccuracies. In this way the interviewer may be able to check the statement of one witness against that of another. He may even check a witness against his own statement and learn which one of the opposing facts is correct and which is in error and whether they are honest mistakes or attempts to mislead or misinform the interviewer.

Using the Positive Approach

Too many interviewers use the negative approach, not only in questioning witnesses but also in making arrangements for the interview, and in asking the witness to sign his statement. The interviewer who asks the witness, "You couldn't meet me at the courthouse this afternoon for an interview, could you?" deserves the "no" answer he is inviting. He has already unconsciously suggested it would be very easy to evade the interview. This is the same interviewer who asks his question by saying, "You didn't see anybody near the scene when you discovered the fire, did you?" When the statement is completed he requests the signature of the witness by saying, "You wouldn't want to sign this would you?" or "Would you care to sign this?" With this type of question the interviewer risks losing control of the situation. He suggests to the witness that he need not appear for the interview, answer the questions, or sign the statement.

The positive approach is preferred because the interviewer then takes control. He sets the time and place of the interview and announces it to the witness by saying, "We have scheduled your interview for 4:30 P.M. at the courthouse — I assume that is agreeable." This suggests everything is all set and that the interviewers are positive and sure of themselves, and it will not be easy to evade the interview. The witness usually accepts the appointment because he never thinks of declining it. He has succumbed to the positive approach, and the interviewer starts off with the advantage of being in the driver's seat. Unless he does something further to destroy confidence or indicate timidity he will retain control of the interview.

The interviewer should formulate his questions in a positive manner and ask for the witness' signature in the same way. He may say, "Read that statement; if it is correct, sign it. If it is not correct, then correct it and sign it." This will usually be done without question by the witness who by this time has mentally acquiesced to the determination and friendly, firm guiding of the interviewer who has dominated and controlled the interview.

If you are in full control of the interview it will not be necessary to attempt to get this feeling across to the witness. He will have sensed it by the confidence you inadvertently express in your manner, speech and method of questioning. However, if this is a borderline case, you may decide to commit several overt acts to firmly establish your relationship. You may decide to politely but firmly inform the witness that no smoking is permitted, just as he is casually extracting a cigarette from his pack. Or, you may direct the witness to another chair after he, without being asked to seat himself, has selected a handy chair. Of course, this is a most difficult procedure which will vary with the individual being questioned and with each type of interview. This problem usually adjusts itself as the interviewer acquires experience.

Questions asked at the start of the interview should be friendly, and asked in such a manner as to calm the nervous witness, settle the agitated witness, and placate the antagonistic witness. Therefore, these initial questions should be simple, single purpose questions of an uncontroversial nature. The usual procedure is to ask the identifying questions pertaining to name, address, age, and employment, and then lead into questions about the witness' background. Ordinarily these questions are inoffensive in nature and even the most suspicious or reluctant witness will usually answer them. Once you have the witness talking and answering questions, you may ask more pertinent questions, but lead into these important questions slowly, gradually, and naturally. Do not be too abrupt about it.

Take possession of the witness and be the master of the situation from the very beginning. Be friendly but firm, and do a good job of selling yourself to the witness. Do not be afraid to spend some time in a preliminary "getting acquainted" period. An old trick of experienced interviewers is to establish a point of common interest with the witness. Naturally this will require that the interviewer study and make an appraisal of the witness during the first few moments of the interview. The points of common interest which the interviewer uses to get acquainted might be sports, farming, the high cost of living, taxes, or a recent news story which is getting prominent attention on the front pages at the time of the interview.

Once you can get the witness to start talking, regardless of whether or not the conversation pertains to facts which are to be discussed in the interview, you will then be in a position to guide the conversation into a discussion which will involve the facts about which information is desired.

When talking to a local witness, when I am on the road, I often make use of diagrams and sketches pertaining to the locality of the investigation and with which the local witness is usually familiar. I have seen reluctant and hesitant witnesses "open up" under these circumstances because they have suddenly become "experts" when pointing out places, streets, and buildings on the diagram, which are familiar to them. They are in a position to instruct the investigator, and it is human nature for most persons to take pleasure in instructing, or being considered an expert on any subject.

Getting the Specific Details

If the investigator desires to be thorough, he must be specific and avoid generalities. He must "pinpoint" the witness with the aid of details in order to avoid vagueness. In a recent investigation a witness was questioned as to his whereabouts at the time the crime was committed. He stated he was sitting in a bar drinking with a person whose name he furnished. The investigators asked the witness (who later, because of this interview became a suspect and eventually confessed to the crime) how his companion was dressed, what he said, what they were doing, who paid for the drinks they were having, how much was paid, the amount of change that was received, who else was present, what kind of drinks each of them had, if his friend usually drank that brand of beer, and other specific questions which called for detailed answers. The replies of the witness furnished him with an alibi, but inexorably committed him to having been with that person at that time in that place.

When the person who was given as an alibi was questioned, he at first attempted to substantiate the story of the witness, but when questioned closely, he was unable to corroborate in

detail the exact location of the spot in the barroom where they were sitting, the kind of drinks each was drinking, the description of the clothing each wore, who paid for each round of drinks, the price of the drinks, the money offered in payment, the change received, who waited on them, whether or not the television was on, what program was on at that time, which bartender was on duty, or the name or description of any others present. It was evident to the investigators that the two men had not been together at the time and place they indicated and further close interviewing brought out the truth from both persons.

The interviewer should give particular care to the form and phrasing of the questions he asks. Avoid the common mistake of putting the answer into the question. Do not ask questions such as "Is your name Eugene Casey?" Rather ask "What is your name?" Let the witness supply his own answer.

I usually try to ask questions which cannot be answered by a "Yes" or "No." An example of such a questions is "Where were you yesterday morning?" Then you can prompt and keep this witness talking by asking an occasional question such as "What did you see?"; "How was he dressed?"; "What time was that?"

Avoid asking questions which can be answered with a question. Don't say "John Brown is a criminal, isn't he?" Your witness may say "I don't know, is he?" You may find yourself being interviewed by the witness. That same question might be asked "Was John Brown ever convicted of a crime?"

Avoid statements which are meant to serve as questions such as "Your name is James Black?", or "You are the man who discovered the fire?" Ask true questions in the proper form.

Cautions to Observe in Interviewing Female Witnesses

The investigator must exercise particular care and discretion when interviewing a female witness. He must be careful not to allow himself to be compromised or placed in an embarrassing position. He must use discretion in selecting the place to interview the female witness and the persons who are to be present. He must further be very careful that he does not question her at unusual hours. I never allow myself to be left alone with a female witness; I always try to have another woman present, usually as a stenographer, or at least a witness representing my interests. I always avoid questioning women witnesses in hotel rooms and try to conduct these interviews in offices, courthouses, or other suitable places during the daytime. I also am especially careful to be extra courteous and well-mannered when in the presence of a female witness. When the interview involves a discussion of sex or other delicate questions,

the interviewer may decide to ask all other persons to leave the room, including the female stenographer, feeling that complete privacy will be less embarrassing and more conducive to getting the facts.

The juvenile witness is another delicate problem and although this situation is handled differently in various states, a general suggestion might be to follow the precautionary rules for interviewing a female witness. Always make sure that you are complying with the local and state laws regarding the questioning of juvenile witnesses. I usually attempt to interview juveniles in the presence of a representative from their school, such as a principal or teacher. In many instances, juvenile officials are required to be present, but whether or not they are required to be present it is often an asset to have them.

The questioning of a juvenile differs from that of an adult male or female witness. The interviewer must ask different types of questions and spend a great deal more time in the "getting acquainted" period. Children are usually more suggestible than adults and, therefore, the interviewer must take care that he does not suggest the answer that he desires to certain questions. The juvenile may "assist" him by giving the desired answer, regardless of the truth of the situation.

I have found the use of the blackboard most helpful when questioning juveniles, particularly with reference to locations and places which have been indicated by diagrams on the board. Photographs also have been found to be a valuable asset in interviewing juveniles. A paternal attitude on the part of the investigator toward the juvenile has proven successful on many occasions. Naturally the chronological and mental age of the juvenile should be a factor in governing the conduct of the investigator. No definite or set rules can be given an investigator with regard to questioning juveniles. However, some suggestions to follow are: be careful, considerate, confidential, and avoid frightening the juvenile witness.

Handling the "Willing Witness" and the "Hostile Witness"

The "willing witness" is a friendly witness who wants to help. He should be guided and kept from wandering until the pertinent facts have been related. The interviewer often has to draw the witness out, and require him to be more specific and give details if he tends to be vague or general. He should be encouraged to name other persons who can verify or add to the facts he discloses. The interviewer must be careful that this type of witness sticks to the facts. Some willing witnesses distort facts in their eagerness to help, or restate rumors as facts. The interviewer must verify the willing witness' story just as though he were a reluctant witness.

Honest and willing witnesses may make inaccurate and untruthful statements due to imperfect observations or failure to observe and remember all the facts and details of a situation.

The "hostile witness" may be so because of his friendly feelings toward the person who he believes is the suspect in the investigation. Some hostile witnesses will become abusive. The witness must not be allowed to involve the interviewer in an argument. An intelligent interviewer will maintain his temper while the witness loses his. Remember, a man does not think clearly or act sensibly when he is arguing in a hostile manner, Keep him talking. He may say things in anger which he wouldn't say otherwise, and they may be important. Keep him talking. He may talk himself out and cease to be hostile or angry. He may then be developed into a repentant witness, talkative and informative.

If the interviewer feels that this witness is an honest person he may decide to spend some time educating him. The interviewer may explain that the investigators are not trying to persecute anyone, but merely to establish the facts as to what happened and how. He may then tell the witness that a full and complete disclosure of the facts will assist the innocent persons in clearing them of all suspicion, whereas any distortion or withholding of facts by witnesses will only aid guilty persons in escaping detection.

If the hostile witness is not an honest person, and is attempting to shield someone regardless of his guilt, the interviewer may decide to place this witness under oath and then take his statement, complete with falsehoods, misrepresentations, and discrepancies. He may then proceed in the same manner as with a "lying witness."

Lying, Indifferent, and Suspicious Witnesses

The "lying witness" should be encouraged to talk and encouraged to tell his lies in complete detail. He should then be questioned so that he has to tell several lies to cover up the original false statements. As one lie begets another, he will surely be caught in his own web of lies and be forced to tell the truth. If the interview is conducted under oath, the interviewer may be in a position to threaten the witness with a perjury charge if he does not tell the full and complete truth.

The "indifferent witness" is one who does not volunteer any information because he is afraid he may become involved or have to go to court and waste his time testifying. He usually does not want to be interviewed. On the other hand, he will not usually lie or attempt to protect anyone. He is basically lazy, but honest in his fashion. The interviewer must drag out the

information. It is in an interview with this type of person that the interviewer is called upon to exert his utmost skill and ingenuity. The questions asked must be carefully phrased. The interviewer may play upon the lazy nature of the witness and explain that a full and complete detailed statement at this time may save the witness the trouble and bother of several additional interviews in the future, when it is learned that he possesses certain additional information which he withheld.

The "suspicious witness" is usually an inquisitive witness. He wants to know what the interviewers know about him and about what he knows. His cooperation may depend upon how much he thinks the interviewers already know. Make use of inference with this type witness. Infer that you already know the facts but want to hear if his story substantiates them.

The use of trickery is sometimes helpful with this type witness. Ask a question or two about something to which you already know the answer. After he has answered, indicate in a subtle manner that you already knew the answer to that question. You may ask him what school he attended, and after he has answered "Funston School" and you have passed on to several other questions, you might pause to summarize and say, "You have stated you attended Frederick Funston Grammar School from February of 1924 until June 1931." Actually he never mentioned the full name of the school or the dates of his attendance, and he will probably be quick to note this. He may feel that you have a full and complete record of his activities, as well as a knowledge of what happened. His suspicious nature may lead him to believe that you are trying to trap him by asking questions to which you have the answers, and he may decide to "trick" you by giving a full and completely truthful account of the facts.

Interviewing Is an Art

No set rules can be given for interviewing because it is not a science. It is an art wherein each interviewer develops his own style and manner. What one interviewer does successfully sometimes is poor procedure when tried by another. Here are twenty suggestions to interviewers which I have followed and found helpful:

1. Prepare for the interview.
2. Choose the best time for the interview.
3. Choose the best place for the interview.
4. Select the persons to be present.
5. Keep the number of persons present at a minimum.

6. Take your time during the interview.
7. Maintain control of the interview at all times.
8. Don't talk too much.
9. Ask simple, short, brief questions.
10. Avoid asking questions that can be answered "yes" or "no."
11. Phrase the questions so they do not contain any information, but require the witness to supply the information in his answer.
12. Get the witness to talk and keep him talking.
13. Guide his conversation into the proper channels.
14. Try to get the witness to corroborate or disprove his own statements.
15. Be thorough and detailed.
16. Be tactful - don't embarrass the witness.
17. Be sympathetic but not sentimental.
18. Be friendly but firm.
19. Don't tell the witness all you know.
20. Be especially careful when interviewing juvenile or female witnesses.

Do not hesitate to violate one or all of these suggestions whenever you believe the purpose of the interview will be furthered by so doing.

POLYGRAPH (LIE DETECTOR) TESTS AND INTERROGATIONS

The Polygraph or "Lie Detector", even in its present limited state of perfection, has been proved to be an invaluable aid when used by an experienced operator, providing its limitations are fully appreciated by the enforcement official utilizing the results.

In criminal investigations the Laboratory is prepared to give Polygraph tests to any of the following subjects: (1) suspects; (2) principals; or (3) material witnesses providing the witnesses may have made statements contrary to fact, or may be withholding information, or have made conflicting statements. The Laboratory maintains the most modern facilities for undertaking "Lie Detector" tests. In addition, the tests are administered by an experienced criminal investigator. It must be stressed that the Laboratory's activities are confined to matters which are a part of criminal investigations.

Preliminary Arrangements

A Polygraph or "Lie Detector" test must be administered under controlled circumstances. For this reason the test is administered in the Laboratory in Madison.

When a district attorney or a responsible administrative officer of an enforcement agency is requesting the Laboratory to undertake a test, one of the Laboratory case referral forms should be completed and forwarded to the Laboratory together with as complete information as possible concerning the facts established as the result of the investigation. In this preliminary communication the number, names, ages and sex of subjects and full particulars of the investigation should be included. If any statements have been made by any of the subjects, copies of such statements and full particulars should also be forwarded with the initial request for assistance.

When the preliminary arrangements are made, either by letter or by phone, for acquainting the Laboratory with the details of the investigation at hand, desired alternate dates and times for a suggested appointment for having Polygraph tests given should also be recommended to the Laboratory.

Upon the receipt of a request, the Laboratory will immediately advise either the submitting agency or the district attorney of the first open time on the Laboratory's schedule for the tests. A definite appointment is then made.

It is not necessary to obtain a signed agreement from any subject agreeing to undergo such tests; likewise it is not necessary or advisable to have subjects sign a waiver preliminary to the giving of the actual tests. The Laboratory has discouraged this practice since in

our opinion it serves no useful purpose.

It is suggested that the responsible official of the enforcement agency which is conducting the investigation, interview and take a statement from the subject concerning his alibi, possible participation, or guilty knowledge of the overt act or possible accomplices involved in the investigation. A copy of this statement should be made available to the Laboratory if a Polygraph test is to be given either to the suspect or to the accomplices.

The "Lie Detector" subject's alibi should be very carefully investigated. The results of such investigation, together with a review of the facts developed during the entire investigation, should also be made available to the Laboratory.

In taking a statement from the suspect or accomplices, the interrogator should avoid the disclosure of any details or facts established in the investigation not known to the subjects. If this precaution is disregarded, it may preclude the Laboratory's conducting the best possible informative and reliable tests.

The chances of a successful conclusion to an investigation are greatly enhanced when the suspect involved in an investigation is made available for a "Lie Detector" examination in the early stages of the investigation. Unreasonable and prolonged interrogation of a person produces a recalcitrant, antagonistic subject, who thereafter may not be considered a fit subject for a "Lie Detector" examination.

It is imperative that the subject has had a normal amount of food and sleep during the twenty-four hours preceding the giving of Polygraph tests. A person suffering from a severe hangover or under the influence of alcohol, sedatives, opiates or suffering physical pain, or an acute or severe cold or respiratory involvement is ordinarily not considered to be in a fit condition for a Polygraph examination.

In the investigation of sex offenses, such as statutory rape, forcible rape, adultery or indecent liberties, the Laboratory has established the policy where practicable of insisting that the victim and/or complainant in such offenses be made available to the Laboratory for purposes of being questioned by the Polygraph operator at the Laboratory. Experience has shown that the Polygraph operator benefits greatly by having first-hand, detailed information from the victim. In some cases it has been found advisable to examine the victim for the purpose of ascertaining whether or not he either is withholding information concerning the alleged offense or is falsely accusing the suspect. The suggested method has proved superior to relying on the results of a routine investigation in which statements may have been taken by an officer unfamiliar with the investigation of an offense of this type.

Occasionally, in cases in which it is proposed that Polygraph examinations be made, attorneys representing either suspects, witnesses,

or principals in the criminal investigation have requested that they be permitted to be present at the Laboratory during the conduct of such tests. If a request of this nature is received, permission will only be granted if the interested district attorney authorizes it. The Laboratory discourages such practice except under unusual circumstances and, as has been indicated, will permit this to be done only with the approval of the district attorney who is concerned with the particular investigation at hand. When such requests are received, it is recommended that the Laboratory be so advised by the district attorney at the time the appointment is requested. Each such request will be considered individually and the district attorney will be advised concerning this.

Because of the exceedingly heavy "Lie Detector" schedule at the present time, it is urgently requested that every effort be made to have the officers and subjects available at the appointed time for the tests. If for any reason it appears impossible to keep the scheduled appointment, the Laboratory should be advised as soon as this is known. (For example, if the subjects disappear or are otherwise made unavailable, the appointments should be cancelled at once.) Notify the Laboratory either by State Traffic Radio, telephone or telegraph.

The Laboratory has no facilities for the overnight detention of persons under arrest. Prior arrangements for such detention should be made either with the Madison Police Department or with the Dane County Sheriff's Office.

Administering the Test

It is imperative that the proper initial approach to the subject be used prior to his undergoing a "Lie Detector" examination. We feel that the experienced Polygraph operators at this Laboratory should be the ones to undertake this orientation and indoctrination of a Polygraph subject.

The Laboratory, being acquainted with the details and particulars of giving such tests, feels that it is in the best position to counsel either with enforcement agencies or the district attorney as to the most desirable sequence of examination of subjects under given circumstances. This, of course, can be determined only after the Laboratory has been acquainted with the facts and particulars in the subject investigation.

At the time of the appointment, it is suggested that either the district attorney or the investigator who has actually participated in the investigation and is therefore the most familiar with the facts and particulars of the pending investigation also be available at the Laboratory in order to relay first-hand to the Polygraph operator the facts, detailed particulars, and developments in the pending investigation. The district attorney or the investigator should remain at

the Laboratory until the completion of the Polygraph or "Lie Detector" tests.

Unfortunately there is no shortcut in the giving of such tests. It is the opinion of the Laboratory that such tests should be properly, thoroughly, and completely undertaken. This is a time consuming process; there appears to be no shortcut worthy of being considered seriously.

The nature of the Polygraph or "Lie Detector" tests is such that the Polygraph operator does not confine himself solely to the questions which may be of interest to the investigator. Control situations can often be developed around stimulus questions relating to actual or manufactured offenses, in order to measure the subject's responses to controlled stimuli.

It should be pointed out that "Lie Detector" tests do not replace a thorough and complete investigation. Such examinations are a supplement to what is presumed to have been a thorough and complete investigation of the matter at hand.

At the completion of the necessary control and supplementary tests it is the policy of the Laboratory to advise verbally either the district attorney or the ranking administrative officer present who represents the submitting agency of the results. This information is later supplemented by a written report summarizing the results of a more careful examination of the Polygraph tests run on the subjects.

Our experiences, which have involved the examination of many thousands, has indicated that about 12 to 17% of the subjects have to be given an "indefinite report."

Applying the Results of the Test

At present the results of "Lie Detector" tests are not admissible as evidence even when a prior stipulation or agreement has been entered into by the subject and his counsel. Results of such tests are not in our opinion admissible as evidence in Wisconsin in view of the adverse decision in the LeFevre[1] case. It is the Laboratory's plan to resubmit this question to the State's Supreme Court for its reconsideration. Before this can be successfully accomplished, however, the Laboratory's development program in this field must proceed to the point where we can show that, since the LeFevre case, better instrumentation, additional criteria and improved techniques have been achieved.

It is the view of the Laboratory that neither now nor at any forseeable time even with improved criteria and techniques should an attempt be made to offer the results of "Lie Detector" examinations or tests in evidence over objection of opposing counsel. It is the considered opinion of the Laboratory that such tests are at best limited

[1]LeFevre v. State, 242 Wis. 416

in their use as an element or elements of corroboration for other established facts or circumstances either in criminal investigations or prosecutions.

The Laboratory's facilities include equipment for recording of statements or confessions which may be obtained during the interrogations following the "Lie Detector" tests. In cases of the first magnitude, typed transcripts of such recordings can be made available to the district attorney, in addition to the original tape recording which he can retain until the case has been completed.

The Handling of Exceptional Subjects

In cases involving a subnormal or mentally deranged person, the Laboratory believes that the best method of ascertaining whether or not such subjects are suitable for examining with the Polygraph is to process them in the customary manner. These examinations include control tests and other criteria useful to the experienced Polygraph operator in determining whether or not such subjects are responding in a manner suitable for reliable interpretation of these tests. The speculations of other types of technically, as well as professionally, trained criminal investigators as to the value of "Lie Detector" tests for these cases, should usually be disregarded.

In cases involving juvenile subjects, there is no hard and fast rule which would permit us to determine even with reasonable accuracy the minimum age which should be considered unsuitable for Polygraph tests. The answer to this question involves the mental development of the juvenile, his acuity, the circumstances involved, etc. A child of 7 years, having average intelligence, would ordinarily be considered, all other things being equal, a suitable subject for Polygraph tests. A subject, however, who is the unfortunate victim of arrested mental development, even at the age of 18 or 20 years, might not be considered a fit subject.

Subjects with impaired hearing to an advanced degree are not considered fit "Lie Detector" subjects. Again no hard and fast rule can be made.

Subjects unable to comprehend or to speak English, of course, must be handled through a competent interpreter. The giving of "Lie Detector" tests under such conditions is time consuming and should be attempted only where crimes of the first magnitude are involved.

Part III

TESTS FOR ALCOHOLIC INTOXICATION

SCIENTIFIC TESTS FOR ALCOHOL INTOXICATION

Frank L. Kozelka, Ph.D., Associate Professor of Toxicology,
Department of Pharmacology and Toxicology, University of Wisconsin,
Madison, Wisconsin

The great number of deaths and injuries resulting from motor vehicle accidents is a matter of common knowledge. Highway accidents kill approximately 40,000 people annually and injure a million more. While it is rather difficult accurately to evaluate the part that alcohol plays in these accidents, nevertheless statistical information based on scientific studies suggests that in fifty per cent or more of the accidents, the driver had been drinking. It is quite evident that safety on the highways would be improved materially if it were possible to eradicate the evil of the drinking driver. Even those who like to take an occasional drink readily realize that a point may be reached where the ingestion of alcohol becomes dangerous, not only to others but also to themselves.

Although the drinker should be permitted to enjoy his drink, protection to others requires that the motorist while drinking should not drive a motor vehicle on the public highways. This protection to others has been sought through statutes imposing criminal penalties for driving while "under the influence." Under such legal regulations, however, it has often been very difficult to secure convictions in court. The driver, charged with being "under the influence," usually claims that some other element was the cause of his condition, or that although he had been drinking, his indulgence had been but slight--a beer or two--to produce the odor on his breath but not sufficient to impair his judgment or affect his conduct. In the event of an automobile accident, excuses are so numerous and easily fabricated that it is often difficult to obtain evidence of intoxication even in extreme cases. The jury could be easily beguiled by those escapes from civil or criminal responsibility.

The applications of behavior tests by police officers and physicians are so subject to variations of interpretation and possible errors that the usual criteria for intoxication, i.e., odor of the breath; dilated pupils; flushed face; staggering gait; confused, thick speech; boisterous, euphoric, or abusive behavior, fail to give reliable information as to the true condition of the individual. Even though an individual may exhibit the symptoms of intoxication, the doctor could not honestly say that his physical findings proved the presence of a single drop of alcohol in the body of the accused. Conversely, a person may be under

Reproduced with the permission of the author and the Wisconsin Bar Bulletin which will publish this article in their November, 1951, or February, 1952, issue.

the influence of alcohol to an extent that seriously affects his faculties and behavior, especially in such a responsible position as driving an automobile, without exhibiting these commonly recognized symptoms. This is especially true, immediately after the accident has occurred, where the stimulus of a sudden shock or the knowledge that somebody has been seriously injured or even killed may be sufficient to overcome the depressing effect of the alcohol. The individual under these circumstances may appear fairly normal. It is a recognized fact that any stimulus, be it pharmacological, mechanical or mental, tends to overcome or partly mask the depressant effect of alcohol.

A chemical examination of body fluids or tissues definitely demonstrates whether or not alcohol is present and in what concentration. The replacement of guesswork and superficial opinions, and even personal prejudices, by positive scientific evidence seems very desirable, not only to strengthen the enforcement of the law against the drinking driver, but also to protect the innocent who may be charged with a criminal offense because of some preexisting pathological condition. There are many cases on record, as well as within my own experiences, in which individuals were charged with driving an automobile while "under the influence" because they manifested symptoms resembling those of alcoholic intoxication. An individual was followed for about a half mile by a squad car and was observed to be driving from one side of the road to the other. When he was stopped by the police, he protested his innocence and consented to a blood test. The chemical examination disclosed that the blood did not contain alcohol and that the accused was telling the truth. A further investigation disclosed that he had suffered a severe head injury six months previously and had not completely recovered. To be sure, this type of individual should not have been issued a license to drive an automobile. However, he was not guilty of a criminal offense.

In another instance an individual (involved in an automobile accident in which one person was killed) was known in his community as a chronic alcoholic. The blood specimen was obtained by a local physician who forwarded the sample to my laboratory with the comment, "You will undoubtedly find a considerable amount of alcohol in this man's blood." The specimen, however, did not contain any alcohol, and he was subsequently exonerated from any blame. Protection of the innocent is just as important as conviction of the guilty, and nationwide adoption of the body fluid tests for alcohol by thoroughly competent analysts who can qualify themselves by training and experience, will accomplish the desired end.

Chemical tests for intoxication are based upon certain well-established basic knowledge relative to the behavior of alcohol in the body, and the response of the body to given concentrations of alcohol. According to Wilfred Derome,[1] who was Professor of Legal Medicine and Toxicology at the University of Montreal, the quantitative procedure for the determination of alcohol in the human

organism constitutes one of the best methods which science has ever put into the hands of justice, a conclusion with which the vast majority of scientists will agree.

Normal Alcohol

Normally the body tissues do not contain significant quantities of alcohol. Gettler et al.,[2] who developed a technique for the isolation and characterization of micro quantities of alcohol, reported that human blood contains .004 per cent, or 4 milligrams of ethyl alcohol per 100 grams, while the other tissues contain lesser quantities. Harger[3] found that the alcohol-like substance normally present in blood, urine or body tissues does not exceed .2 milligram of alcohol per 100 grams. Consequently, it is quite evident that the so-called normal alcohol of the body has no significance in the matter of chemical tests, since the smallest concentration of alcohol producing a measurable effect on the individual (20 to 50 mg. per 100 grams) is considerably above these values.

Absorption and Distribution

When an alcohol-containing beverage is ingested, it is absorbed very rapidly and reaches a maximum concentration in the blood in from one-half to one hour. Harger, Hulpieu, and Lamb,[4] working with dogs, found that the absorption of alcohol was more than half complete at the end of 15 minutes, and that it was almost entirely finished at the end of two hours. They also reported that a portion of the alcohol is regularly stored in the gastro-intestinal tract and its contents, and that the point of complete absorption is reached when the concentration of alcohol in the gastro-intestinal tract reaches equilibrium with the remainder of the body. At this stage the concentration of alcohol is essentially the same in all the organs; the slight variation being due to the variations in the water and fat content. It is generally accepted that alcohol is absorbed and distributed in the body fluids by diffusion, and that the relative concentration of alcohol in the various tissues is dependent upon the water content. Absorption of alcohol from the stomach of laboratory animals and man was found to follow the laws of diffusion, according to Berggren and Goldberg.[5]

A considerable amount of data, on man and laboratory animals, have established that the concentration of alcohol in the blood has a different course if the alcohol is taken on an empty stomach, or with food, or when taken in a relatively concentrated form as brandy and whiskey, or weak alcoholic solutions, such as beer or mixed drinks. In general, the blood-alcohol-curve can be divided into three general phases: (1) the early absorption period of rapid rise in the blood alcohol level; (2) the distribution phase in which the alcohol is approaching equilibrium in the tissues and reaches its peak concentration; (3) the post-absorption combustion phase

in which the alcohol levels fall in a rectilinear manner. When alcohol is taken in a concentrated form as a whiskey or brandy, on an empty stomach, it reaches its maximum concentration in the blood in about 30 minutes and then rapidly falls, first at a slightly higher rate corresponding to the distribution phase, followed by a constant rate corresponding to the post-absorptive combustion phase. When alcohol is taken with food, the part of the curve during absorption is prolonged and its maximum is lower and appears later. Miles[6] attributed the delayed absorption to the diluting effect of the stomach contents on the alcohol ingested, weak alcohol solutions being absorbed at a slower rate than those more concentrated. This observation is in full accord with the diffusion theory of absorption. Mellanby,[7] in experiments on dogs, attributed these changes in the curve to delayed absorption, which was most influenced when the food taken contained milk and fat. Haggard, Greenberg, and Lolli[8] also observed that milk had the greatest effect in man, while butterfat exerted the least influence. Delayed absorption was also well demonstrated by Goldberg[9] in experiments on man, in which the same quantity of alcohol was taken during fasting as with a meal. He found that the curve after alcohol with food exhibited an appreciably lower maximum and a slower decreasing phase which he interpreted as a great delay in absorption both as concerns time and rate. The absorption continued for a period of 4 to 6 hours.

Absorbed alcohol is excreted in the urine, saliva or sweat up to approximately 10 per cent, and the rest is metabolized in the system by being oxidized to carbon dioxide and water. The preponderance of the evidence indicates that all the alcohol utilized in the system is metabolized in the liver. Fiessinger et al.[10] and Lundsgaard[11] demonstrated, by perfusing liver preparations, that alcohol is metabolized in this organ at a constant rate, while on the other hand neither the resting nor working muscle was capable of utilizing it in significant quantities. Neymark and Widmark[12] also reported that alcohol disappeared at a constant rate when the administration of alcohol was repeated at regular intervals. This phenomenon can be utilized, in a limited sense, if a blood specimen cannot be taken until one or two hours after an accident in estimating the level of alcohol present at the time of the accident, provided the individual has not taken a drink at least 30 minutes prior to the mishap. However, it is always highly desirable to obtain the specimen as soon as possible after the accident has occurred.

Alcohol is a depressant drug having its primary effect on the central nervous system, especially the higher functions. It simulates stimulation chiefly by lowering the normal restraining functions, and consequently is frequently referred to as a stimulant. The psychical symptoms show individual differences according to temperament and circumstances but appear with increasing concentration of alcohol through euphoria, enjoyment, loquacity to hebetude,

stupor, and finally coma. Varied degrees of loss of muscular control appear at relatively low concentrations. Heise[13] studied the effects of ingestion of small amounts of alcohol and found measurable losses of efficiency and judgment in the operation of a typewriter even when the concentration of alcohol in the urine or blood did not exceed .02 per cent (.2 mg. per cubic centimeter). In another series of experiments he tested the effect of alcohol on automobile drivers and found that, without exception, these subjects were able to pass creditably the ordinary tests used to determine intoxication, and were able to perform the routine actions involved in driving. However, he found a definite variation from the normal in actions that had not become a habit, such as the avoidance of obstacles, backing of the car, or any unusual action from one that was routinely used. In none of these subjects did the alcohol concentration in the urine exceed 1 mg. per cc. These results are in close agreement with those obtained by Carlson[14] who observed some functional impairment when the concentration of alcohol reached 1.17 mg. per cc. The observation, that reaction time is lengthened and that the psychophysiological functions of importance in motor car operation are impaired before the characteristic symptoms of intoxication are apparent, is further corroborated by Bahnsen and Vedel-Petersen.[15] In their experiments on motor car operators they observed that alcohol lowered the grade of performance when 97 cc. of whiskey was ingested. In this subclinical stage when there is 1 mg. or less of alcohol per cc. of blood, the changes produced in most cases are so slight as to be readily overlooked except by a very careful observer. Nevertheless, the effect is manifested in a blunting of the finer judgments and observation, and usually results in a feeling of euphoria and increased confidence in one's abilities, both physical and mental.

Consequently, individuals under the influence of alcohol have a tendency to drive faster than they would normally do. Goldberg,[9] in the most comprehensive study on alcohol available, determined the effect of blood alcohol levels on three types of functions: (a) sensory, (b) motor, and (c) psychological; there were three classes of individuals, 11 abstainers, 25 moderate drinkers, and 14 heavy drinkers. The abstainers were mostly students who had never, or only once or twice a year, taken alcohol. These individuals were given .63 to 1 gram of absolute alcohol per kilogram of body weight. The moderate drinkers, who came from all the social classes, varied in their alcoholic consumption from small quantities, to rather regularly one to two liters of potato brandy per month. This group received 1.0 to 1.42 grams of alcohol per kilogram of body weight. The heavy drinkers were accustomed to taking 1/4 to 1/3 liter or brandy daily. Three were highly educated people, and the others were workmen of varying grades of education. Three were alcoholic addicts, in the medicolegal sense, being under supervision of the State Board. This group received 1.0 to 1.42 grams of absolute alcohol per kilogram of body weight. All of the groups received the alcohol in the form of Swedish potato brandy containing about 40 volumes per cent of alcohol. He recorded the deviation

from a previously established norm for each individual as well as the alcohol concentration of the blood at the time of each observation. It was found that in all these tests the abstainers were found to exhibit subnormal performance at blood alcohol levels of .10 to .50 mg. per cc. The moderate drinkers began to exhibit subnormal performance at blood alcohol levels of .36 to .74 mg. per cc., while the heavy drinkers began to exhibit subnormal performance at blood alcohol levels of .74 to .90 mg. per cc.

Taking of alcohol on a full stomach rather than on an empty stomach resulted in a diminution of approximately 40 per cent in both the blood alcohol and the performance abnormality, which indicates that the lowering effect of food on alcohol intoxication is due to its depression of the rate of absorption. The data also show that the moderate drinking group metabolized alcohol about 9 per cent faster than the abstainers, and the heavy drinking group utilized alcohol about 25 per cent faster than the abstainers.

Tolerance

It is a matter of common knowledge that the person accustomed to the use of alcohol can drink more and show fewer symptoms of toxicity than the person not so accustomed, although the mechanism of this phenomena is not entirely understood. It is commonly believed that a chronic alcoholic can tolerate a higher concentration of alcohol in the blood or tissues without exhibiting symptoms of intoxication. Opinions differ as to the causes of this habituation. However, the available data on this problem suggest that the limited tolerance acquired through habituation is due to a combination of several factors: (1) The habituated individual acquires the ability to utilize alcohol at a greater rate than the unhabituated person. (2) The habituated individual acquires an increased ability to compensate psychically and functionally for the effects of the intoxicant. (3) There may be a changed reaction of the nerve cells to the effects of alcohol so as to adapt them to the drug environment. On this last point there is no concrete evidence available; however, habituation acquired for a particular drug may hold also for other drugs having a similar action. An habitual drinker becomes generally, somewhat resistant to general anesthetics.

Referring again to Goldberg's data,[9] it will be recalled that in the three groups of functions tested, the moderate and heavy drinkers exhibited an increased tolerance. He interpreted this to mean that habituation to alcohol in man is primarily increased tolerance. However, psychic compensation was suggested because of the fact that the degree of intoxication for some of the symptoms was observed to be higher at a given blood alcohol concentration during the rising part of the alcohol curve than during the falling phase. Although he does not attach any significance to the differences in the rates at which the three groups metabolized the alcohol, it appears that an increase of 9 per cent for the moderate

drinkers and 25 per cent for the heavy drinkers over the abstainers cannot be ignored. These results, in general, are in agreement with previously published data by Pringsheim,[16] working with rats and rabbits, who found that habitués burn up alcohol faster (approximately two-thirds of the time) than normal animals; that normal animals reach a 66 per cent higher content of alcohol in the blood than habitués. He also found that normal animals absorb 20 per cent more alcohol in the first two hours than do the habitués. The greater absorption and the lower rate of oxidation are reasons why the alcoholic content of the body rises to a higher level in normal individuals.

Schweisheimer,[17] investigating the alcohol content of blood in human alcoholics and normal individuals, corroborated Pringsheim's results with animals. His results show that the maximum alcohol content is higher in normal persons than in drinkers; that it reaches the maximum in from one and one-half to two hours, remains at this level for five hours and then gradually diminishes. In habitués he found that the alcohol reaches its maximum more quickly, remains at this level for two hours, and then subsides much more quickly. He concluded that tolerance is due to the decreased "maximum alcohol zone" (period of evident intoxication) which depends on a more rapid rate of oxidation. He could find no proof of increased resistance to alcohol itself. In general, similar results were obtained by Gettler and Freireich,[18] with dogs. The animals received daily doses of alcohol for periods ranging from 6 months to two years. In all cases (habituated and normal controls), intoxication (disturbed equilibrium) set in when the alcohol content of the brain reached .25 per cent. They found, without exception, a smaller alcohol content in the tissues and body fluids of the chronic alcoholic dogs as compared to normal animals. They concluded that the lower concentration is due to increased destruction of the alcohol by the tissues and that increased tolerance is due to more efficient oxidation.

Significant Levels of Alcohol

It will be noted from all the observations previously quoted that all individuals, whether they are abstainers or habitual drinkers, exhibit some deterioration of performance involving the psychophysiological functions of importance in motor car operation at blood alcohol levels as low as 0.5 mg. per cc. in certain instances. Consequently, it appears that the recommendations of the several national committees interested in this subject are fair and give the defendant every advantage even though he be a seasoned drinker. The Committee on Tests for Intoxication of the National Safety Council, and a similar committee of the American Medical Association, recommend:

(I) If the blood contains .5 mg. of alcohol per cc. or less, it shall be presumed that the defendant was not under the influence of intoxicating liquor and should not be prosecuted on the charge.

(II) If the blood contains in excess of .5 mg. but less than 1.5 mg. of alcohol per cc., such fact shall not give rise to any presumption that the defendant was or was not under the influence of intoxicating liquor, but should be considered with other competent evidence in determining the guilt or innocence of the defendant. In these cases the prosecution does not hinge entirely on the blood alcohol level but rather upon the sum total of the officer's observations, the observations of others, the circumstances of the case, together with the chemical results. It is not intended, by these recommendations, that an individual with 1.4 or 1.49 mg. of alcohol per cc. of blood is not under the influence, as has been interpreted by some of the local courts. If an arbitrary level is to be employed, then it should be placed at 1 mg. or 1.2 mg., because it has been amply demonstrated that even habitual drinkers show some deterioration with 0.7 mg. of alcohol per cc. Nor should this recommendation be interpreted to mean that since the case falls in this category, a reasonable doubt exists, and since an individual cannot be convicted of a criminal offense unless proven guilty beyond a reasonable doubt, he therefore is not guilty of the offense.

(III) If the blood contains 1.5 mg. of alcohol or over, it shall be presumed that the defendant was under the influence of intoxicating liquor. In these cases the defendant still has the opportunity to present competent evidence to prove his innocence, and it remains for the court or jury to pass on the guilt or innocence of the individual. If the blood from an average sized individual contains 1.5 mg. of alcohol per cc., he has an amount of alcohol in his system equal to that found in 6 ounces of whiskey or six 12-ounce bottles of beer. Since his system contained this amount of alcohol at the time the specimen was taken, he must have drunk more than this amount to account for the alcohol which was excreted and metabolized during the drinking period.

The courts in the various states have defined the terms "intoxicated" and "under the influence of intoxicating liquor." In Arizona, a decision by the state Supreme Court in 1935,[19] defined the expression as follows:

> "The expression, under the influence of intoxicating liquor, covers not only all the well known and easily recognized conditions and degrees of intoxication but any abnormal mental or physical condition which is the result of indulging in any degree in intoxicating liquors and which tends to deprive him of the clearness of intellect and control of himself which he would otherwise possess. If the ability of the driver of an automobile has been lessened in the slightest degree by the use of intoxicating liquors, then the driver is deemed to be under the influence of intoxicating liquor. The mere fact that the driver has taken a drink does not place him under the ban of the statute unless such drink has some influence upon him, lessening in some degree his ability to handle said automobile."

In Minnesota,[20] the court in discussing the term "under the influence of intoxicating liquor," stated:

> "When a person is so affected by intoxicating liquor as not to possess that clearness of intellect and control of himself that he otherwise would have, he is under the influence of intoxicating liquor."

In Arkansas,[21] the court held that:

> "a man may be said to be drunk whenever he is under the influence of intoxicating liquors to the extent that they affect his acts or conduct so that persons coming in contact with him could readily see and know that the intoxicating liquors were affecting him in that respect."

In Texas,[22] a person was held to be intoxicated when a sufficient quantity of intoxicating liquor had been taken into the stomach to deprive him of normal control. In Mississippi,[23] the court held that

> "in order for a person to be intoxicated it is not necessary for him to be so much under the influence of intoxicating liquor as to be mentally and physically incapable of taking care of himself."

In general, in all these definitions, the central idea of "under the influence" is any deviation from the normal mental or physical state.

Body Fluids to be Examined

The reliability of using the results obtained from an analysis of the various body fluids as an index of intoxication has been the subject of a considerable amount of research. Those fluids most commonly used are the blood and urine. Some investigators insist that the spinal fluid should yield a more reliable index because the concentration of alcohol in the spinal fluid should closely approximate that of the brain, and consequently reflect the degree of intoxication. There is, however, no concrete scientific evidence that this is true. There is a considerable difference in the alcohol concentration of spinal fluid obtained by cisternal puncture and that obtained by lumbar puncture during approximately the first two hours after the ingestion of alcohol. Mehrtens and Newman [24] found that the alcohol in the cisternal fluid rises promptly and closely approximates that in the blood, while that obtained by lumbar puncture attains the height of the diminishing alcohol level of the blood in about 80 minutes, reaches a maximum less than that of the blood, and during the period of decline remains higher than that of the blood. The signs of intoxication in no way

showed the lag that one might expect from the slow rise of the alcohol level of the lumbar fluid. From these observations the authors concluded that the alcohol content of the cisternal fluid is a better index of intoxication than that of the lumbar fluid, while that of the blood is the best of all. Similar results of the study of the relationship of alcohol concentration in spinal fluid obtained by lumbar puncture and in blood were obtained by Schumm and Fleischmann,[25] Abramson and Linde,[26] and Gettler and Freireich,[18] who observed that the alcohol content of the lumbar fluid rises more slowly than that of the blood, and during the period of decline the alcohol in the spinal fluid remains higher than that in the blood. It is generally accepted that the degree of intoxication parallels the concentration of alcohol in the blood. This was well demonstrated by Goldberg[9] who followed the course of intoxication with blood alcohol levels and found that the degree of impairment of the three functions tested--sensory, motor, and psychological--paralleled the blood alcohol levels.

Blood samples are often difficult to procure since they require either the service of a physician or a trip to a hospital. The question arises whether or not an analysis of urine gives as reliable an indication of intoxication as blood. Haggard and Greenberg[27] studied the relative solubility of alcohol in urine and blood and found that alcohol is more soluble in urine than in blood; the ratio of distribution at body temperature was 1.0 for the blood to 1.144 for the urine. They found the same distribution of alcohol, after ingestion, between arterial blood and urine obtained by catheterization. Southgate and Carter,[28] working with human subjects, found that the ratio of alcohol concentration in the blood to that in urine varied between 1.34 and 1.4 after one-half hour. They also observed that this ratio is not changed if the alcohol is taken on an empty stomach or preceded by the ingestion of food. Subsequent diuresis also did not alter the ratio. The apparent discrepancy between the results of Haggard and Greenberg and those of Southgate and Carter is due to the fact that the former investigators obtained the urine specimens by catheterization, and their ratio represents the distribution of alcohol between the two fluids at the time the urine was secreted, and would be comparable to the ratio found during the first half hour after the alcohol was ingested. However, during the period (one to two hours after ingestion) when the alcohol concentration in the blood is decreasing, the ratio increases if the urine is permitted to accumulate in the bladder and may reach a ratio of 1:1.35 to 1:1.40. If urine specimens are analyzed, and the results are divided by 1.3 to calculate the alcohol concentration in the blood at the time the urine was obtained, any error would be in the defendant's favor, because alcohol has a diuretic effect; it would be very unusual that the urine would be retained in the bladder over a longer period than two hours.

While there is an excellent correlation between the urine and blood alcohol concentrations, the main criticism directed against the use of urine is that it may contain volatile reducing substances, particularly acetone in diabetics and formaldehyde after the ingestion of urotropin, which if not removed would be interpreted as alcohol. Gorr and Wagner[29] studied the removal of aldehydes and ketones from alcohol solutions by refluxing the mixture with mercuric chloride in a sodium hydroxide solution for 2 to 5 hours. They found that the acetaldehyde and acetone were removed completely with recoveries of 94 to 96 per cent of the added alcohol. Friedemann and Klaas[30] distilled the alcohol from an acid medium after precipitating the proteins with sodium tungstate and mercuric sulfate and a second distillation from calcium hydroxide containing mercuric oxide to remove any volatile substances other than alcohol which were distilled from the acid medium. Kozelka and Hine[31] developed a technique in which the interfering substances are removed quantitatively by passing the distilled vapor from the acid medium through a solution of concentrated sodium hydroxide containing mercuric oxide. The alcohol is distilled from blood or urine specimens and the interfering substances removed in one operation, which considerably simplifies the determination and lends itself for routine purposes.

There are two methods employed for the determination of alcohol in the breath in which the results are translated to blood alcohol concentration: the Harger "Drunkometer"[32] and the Forrester "Intoximeter"[33]. Both of these methods determine the alcohol-carbon dioxide ratio in alveolar air, based upon the observations that alveolar air contains approximately 5.5 volumes per cent of carbon dioxide (190 mg. in two liters of air), and that two liters of air contain the same quantity of alcohol as 1 cc. of blood. With the "drunkometer" technique, the alcohol is oxidized by passing the air from the balloon through an acid solution containing 1 cc. of N/20 potassium permanganate until the solution is just decolorized. To determine the volume of alveolar air in the sample containing the alcohol equivalent of the permanganate, the same air is passed through a tube containing a weighed amount of ascarite which absorbs the carbon dioxide. From the increase in the weight of the ascarite tubes, the volume of alveolar air used is calculated. According to the authors, the method predicts the concentration of blood alcohol in a fairly satisfactory manner.

With the "intoximeter" technique, the alcohol and carbon dioxide are absorbed from the alveolar air with magnesium perchlorate and ascarite, respectively. The alcohol absorbed by the perchlorate is subsequently determined by distillation and oxidation with the usual oxidizing reagents. The results are expressed in terms of milligrams of alcohol per 200 milligrams of carbon dioxide.

Since the analysis of body fluids for their alcohol content is admissible as evidence in court on criminal charges, the greatest care must be exercised when obtaining the specimen, during transit to a laboratory, and in the analytical procedure. An alcohol-containing solution should not be used in preparing the arm of the patient or used for sterilization of the needle or syringe. The analytical work should be carried out by a chemist well trained in micro quantitative procedures in whom chemical accuracy has been inculcated by experience. Regardless of how perfect an analytical procedure may be, no technique is any better than the individual using it. Whether blood, urine or breath is taken for analysis, the methods involved are highly technical and cannot be delegated to individuals whose training is practically limited to a single procedure (cookbook process), and who are not qualified to accurately prepare and standardize the reagents necessary for the determination. Cases are on record in which the charges have been dismissed by the court, or the defendant has been declared not guilty because of the incompetence of the analyst. The public cannot afford to have individuals escape civil or criminal responsibility, or convict an innocent individual because of questionable evidence. It appears preferable that a central state laboratory be available, since it would be generally away from local influence and therefore an entirely impartial result could be obtained.

The legal phases of this problem are necessarily outside the scope of this paper; however, they are very well covered by Ladd and Gibson,[34] Mamet,[35] Vold,[36] and Monroe[37].

The value of a general educational program by the law enforcement agencies, the legal and medical professions, and automobile insurance companies should not be overlooked. The success of any law enforcement program is determined by the degree of acceptance by the general public. The value of chemical tests should be stressed through all the available media, because the results to be attained in saving lives and property will more than compensate for the time and effort involved.

References

1. Derome, W.: Am. J. Police Science 1: 515, 1930.

2. Gettler, A. O., Niederl, J. B., and Benedetti-Pichler, A. A.: J. Am. Chem. Soc. 54:1476, 1932.

3. Harger, R. N.: Indust. Med. 17: 52, 1948.

4. Harger, R. N., Hulpieu, H. R., and Lamb, E. B.: J. Biol. Chem. 120: 689, 1937.

5. Berggren, S. M., and Goldberg, L.: Acta Physiol. Scand. 1: 246, 1940.

6. Miles, W. R.: J. Pharmacol. & Exper. Therap. 20: 265, 1922.

7. Mellanby, E.: British Med. Res. Council, Spec. Rep. Ser. No. 31, 1919.

8. Haggard, H. W., Greenberg, L. A., and Lolli, G.: Quart. J. Studies Alcohol 1: 684, 1941.

9. Goldberg, L.: Acta Physiol. Scand. 5: Supplement 16, 1943.

10. Fiessinger, N., Benard , H., Courtial, J., and Dermer, L.: Soc. de Biologie Paris 122: 1255, 1936.

11. Lundsgaard, E.: Bull. Johns Hopk. Hosp. 63: 90, 1938.

12. Neymark, M., and Widmark, E.M.P.: Skand. Arch. Physiol. 73: 283, 1936.

13. Heise, H. A.: J. Am. Med. Assn. 103: 739, 1934.

14. Carlson, A. J.: Science 80: 546, 1934.

15. Bahnsen, P., and Vedel-Petersen, K.: J. Indust. Hyg. 16: 304, 1934.

16. Pringsheim, J.: Biochem, Ztschr. 12: 143, 1908.

17. Schweisheimer, W.: Deut. Arch. f. klin. Med. 109: 271, 1913.

18. Gettler, A. O., and Freireich, A. W.: Am. J. Surg. 27: 328, 1935.

19. Steffani vs. State Ariz. 42 Pac. (2nd) 615 (1935).

20. State vs. Graham, 176 Minn. 164, 222 N.W. 909.

21. St. Louis Ry. Co. vs. Waters, 105 Ark. 619, 152 S.W. 137.

22. Lockhart vs. State 108 Texas Cr. R. 597, 1 S.W. (2nd) 894.

23. Yazoo and M.V.R. Co. vs. Davidson, 106 Miss. 108 (63 So 340).

24. Mehrtens, H. G., and Newman, H. W.: Arch. Neurol. & Psychiat. 30: 1092, 1933.

25. Schumm, O., and Fleischmann, R.: Deut. Z. f. Nervenheilkinde 46: 275, 1913.

26. Abramson, L., and Linde, P.: Arch. internat. de Pharmacodyn. et de Therapie 39: 325, 1930.

27. Haggard, H. W., and Greenberg, L. A.: J. Pharmacol. & Exper. Therap. 52: 150, 1934.

28. Southgate, H. W., and Carter, G.: Brit. Med. J. 1: 463, 1926.

29. Gorr, G., and Wagner, J.: Biochem. Z. 161: 488, 1925.

30. Friedemann, T. E., and Klaas, R.: J. Biol. Chem. 115: 47, 1936.

31. Kozelka, F. L., and Hine, C. H.: Indust. & Eng. Chem., Anal. ed. 13: 905, 1941.

32. Harger, R. N., Lamb, E. B., and Hulpieu, H. R.: J. Am. Med. Assn. 110: 779, 1938.

33. Jetter, W. W., Moore, M., and Forrester, G. C.: Am. J. Clin. Path., Technical Sect. 5: 75, 1941.

34. Ladd, M., and Gibson, R. B.: Iowa Law Review 24: 191, 1939.

35. Mamet, B. M.: Am. J. Police Science, incorporated in J. Criminal Law and Criminology 36: 132, 1945.

36. Vold, L.: Nebraska Law Bulletin 17: No. 2, 1938.

37. Monroe, D. G.: Quart. J. Studies Alcohol 8: 385, 1947.

SOME PRACTICAL ASPECTS OF CHEMICAL TESTS FOR INTOXICATION

R. N. Harger
Professor of Biochemistry and Toxicology
Indiana School of Medicine

The employment of chemistry to aid in diagnosing inebriation was first proposed about thirty years ago. However, nearly ten years elapsed before the idea was given a practical trial in the administration of justice. The first application of chemical tests was in coroner's cases, where it was important to know whether the deceased was intoxicated at the time of death. The tests were next used with living subjects, and by 1930 they had been accepted as evidence in courts in Sweden and some other European countries, and also in one or two cities in the United States. These results naturally attracted the attention of people interested in curbing the growing menace of the drunken driver. As a result, the tests rapidly spread to all parts of the world where the automobile had gone. At the present time chemical tests for intoxication are being extensively used in almost every large city in the United States, by several state police organizations, by the medical departments of the Army and Navy, and in certain industrial establishments. Most of the courts in the United States now accept the evidence of these tests. Four states have passed laws providing for such tests and establishing limits of body alcohol for automobile drivers.

Shortcomings of the Usual Signs of Intoxication

Drunkenness is a very common sight and has been described repeatedly since man first began to write. The author of the Book of Proverbs describes the effect of too much wine as "woe, sorrow, contentions, babbling, wounds without a cause, and redness of eyes." Seneca, the Roman philosopher and statesman, wrote about 50 A.D. "drunkenness is nothing but a condition of insanity purposely assumed," and "if you try to prove that the wise man can souse himself with much wine and yet keep his course straight, even though he be in his cups, you may go on to infer by syllogism that he will not die if he swallows poison."[1] Modern writers have added little to these descriptions.

Since drunkenness is such a well-known disorder, why should we ask a chemist to aid in proving that an individual has imbibed too freely? The answer is that, after an automobile accident and in

Reproduced with the permission of the author and the Journal of Criminal Law and Criminology, the copyright holder. Originally published September-October, 1944, Journal of Criminal Law and Criminology, Volume 35, Number 3, Page 202.

[1] Seneca's Epistle LXXXIII: On Drunkenness, From the English version of the Loeb Classical Library, Quarterly Journal of Studies on Alcohol 3:302 (1942).

some other situations, the common criteria of intoxication are frequently unreliable. The usually accepted signs of intoxication are: The odor of the breath, abnormal speech, clumsiness of movement, and evidence of "stimulation."

As regards the odor of liquor on the breath, this is a very unfair test. Although the breath of an inebriated person contains alcohol, the amount present produces very little odor. The breath odor one usually observes is really the flavoring matter of the liquor, and this varies enormously from beverage to beverage. I have seen people who were deeply intoxicated from drinking alcohol diluted with water whose breath fooled even a seasoned policeman, and who were rushed to the hospital by the officer because he thought they were poisoned. On the other hand, the consumption of a small amount of a very fragrant beverage may impart a strong odor to the breath of a person, who is certainly not under the influence of alcohol. Impairment of speech and locomotion may be caused by many things besides alcohol. As for evidence of "stimulation" this requires a knowledge of the person's normal behavior. I do not mean to imply that we should disregard these common signs of intoxication. If an individual's breath smells like a brewery or a distillery, if he staggers, and if he cannot say "Methodist Episcopal" you probably would be correct in calling him drunk. However, when his case is later heard in court, his friends and a sharp lawyer may be able to convince the court that he is a teetotaler,and that he behaved abnormally because of shock or injury. In the absence of chemical tests even a competent physician cannot swear with certainty that the individual had a drop of alcohol in his body.

The common signs of intoxication have sometimes been used to falsely accuse a sober person. An Indianapolis case illustrates this point. A car crashed into a filling station damaging a gasoline pump. The driver was unsteady and talked incoherently. A policeman was called, and he arrested the driver for operating a car while under the influence of liquor. Shortly afterward a chemical analysis of the man's breath showed that he had absolutely no alcohol in his body. Investigation revealed that he was suffering from a physical ailment, and his drivers license was suspended for that reason.

Where the person has been severely injured, the common signs are certainly inadequate due to shock, and in death cases only chemical analyses will yield information.

In order to operate a car, a driver obviously cannot be "dead drunk." The traffic laws of most states do not use the words drunk or intoxicated, but employ the phrase "under the influence of intoxicating liquor." Many courts have held that this means any definite loss of driving ability caused by alcohol, and it includes effects considerably below what would constitute public

intoxication. This means the courts must make decisions even in cases not showing pronounced symptoms where the common signs are less decisive.

Behavior of Alcohol in the Body

Alcohol is the only intoxicating substance in most alcoholic beverages. Within the body, a given amount of alcohol has about the same effect regardless of the beverage which was consumed. Other substances in common alcoholic beverages have practically no effect in changing the results due to alcohol.

When a beverage containing alcohol is swallowed, the alcohol is partly absorbed into the blood from the stomach, but most of it is absorbed from the small intestine just beyond the stomach. In this small gut the absorption of alcohol is very rapid. Experiments in our laboratory, using dogs which were given rather large doses of alcohol diluted with water, showed that if given when the stomach was empty, over half of the alcohol was absorbed in 15 minutes and practically all of it in one or two hours. Food in the stomach somewhat delays absorption, largely because this food causes the stomach contents to become much less fluid, and this hinders the alcohol in the interior from coming in contact with the stomach and intestinal walls. If the stomach empties slowly, absorption of the alcohol is retarded. The alcohol from the stomach and gut is taken up by the blood in the vessels located in the walls of these organs. The flow of blood then carries the alcohol to all parts of the body, where it is stored. The various parts of the body take up alcohol about in proportion to their water content. Since the brain, liver, blood, etc. have about the same fraction of water they will have about the same per cent of stored alcohol. Urine, saliva, and spinal fluid contain more water than the brain, etc.; the per cent of alcohol in these fluids is regularly about 20 per cent higher than that found in the brain, etc. The intoxicating effect is produced by the alcohol stored in the brain, and the degree of this effect is fairly proportional to the per cent of alcohol in the brain.

The stored alcohol is gradually destroyed or "burned" by the body. The average 150 pound person can "burn" about one-third fluid ounce of pure alcohol per hour, which would mean the "burning" of two fluid ounces of 100 proof whiskey in three hours, or one pint (16 fluid oz.) of whiskey in 24 hours. Some people "burn" alcohol faster, and some slower, than the average rate. For a given person the rate of destruction of alcohol is practically constant regardless of the per cent of alcohol in his body. Recent investigations have shown that most of the alcohol "burning" takes place in the liver. As the liver uses up alcohol, it receives more from other parts of the body, so that the per cent of alcohol all over the body decreases at practically the same rate.

It is, therefore, possible at all times, to predict quite closely the per cent of alcohol in the brain by determining the per cent of alcohol in other parts of the body. For this purpose one may use blood, urine, spinal fluid, or saliva. Breath may also be employed because it comes into intimate contact with the blood in the lungs, and the concentration of alcohol in the breath is controlled by the per cent of alcohol in the blood. In fatal cases the brain itself may be analyzed, but with living subjects this procedure would not be very popular. When death occurs alcohol "burning" immediately stops, so that brain or blood taken several hours after death will show the alcohol level at the time of death.

Primary Information Furnished by Chemical Tests

These tests are all chemical analyses for alcohol. They show first the per cent of alcohol in the body substance analyzed. What we wish to learn is the per cent of alcohol in the person's brain, but since brain tissue is not available in living subjects we must use other body materials. The body substances which may be used are: blood, urine, spinal fluid, saliva, or breath. We have already mentioned that the per cent of alcohol in the brain may be calculated from the per cent of alcohol in these body fluids. In the case of breath, 2000 cubic inches of true breath[2] contain practically the same weight of alcohol as one cubic inch of blood.

Since blood was the first body substance to be used, the results of analyzing any of the above body fluids or breath are usually expressed in terms of blood. Thus we say that the individual has a certain per cent of alcohol in his blood, as calculated from the urine, breath, etc.

It should be emphasized that the tests show the per cent of alcohol in the person's body at the time the material was taken from the body. The tests do not show when the drinking was done nor the total quantity of alcohol swallowed, but only the person's load of stored alcohol at the time he was tested. This is precisely the information desired for it represents his condition at that moment.

Having determined the per cent of alcohol in the person's blood we can calculate the approximate quantity of alcohol stored in his entire body. For a person weighing 150 pounds a blood alcohol of 0.1 per cent would mean that his entire body contained about two fluid ounces of alcohol which had been absorbed and stored. This is the amount of alcohol in four ounces of 100 proof whiskey or four twelve-ounce bottles of 4 per cent beer. For a blood alcohol of 0.2 per cent these numbers would be doubled. This way of stating the load of alcohol the person was carrying is usually more easily

[2]This is what physiologists call "alveolar air" and is the last portion of a deep expiration.

understood by judges and juries than the bare percentage figures. If the person tested weighed more, or less, than 150 pounds the calculated figure for total stored alcohol would of course be changed to correspond to his weight. However, the per cent of alcohol should be given too, because the degree of intoxication is controlled by the per cent of alcohol regardless of the person's size.

What Per Cent of Blood Alcohol Means "Under the Influence"?

The concentration of alcohol in the blood of living subjects may vary anywhere from a trace to one-half (0.5) per cent. With 0.5 per cent practically all subjects will be "dead drunk," a condition about the same as surgical anesthesia. Few intoxicated drivers will have above 0.35 per cent of alcohol in the blood, because with higher concentrations they could not remain at the wheel.

Where in this range of blood alcohol should a driver be called "under the influence"? The only way to properly answer this question would be to try out chemical tests on several hundred drinking individuals having various per cents of blood alcohol, and to determine the relationship of blood alcohol per cent and impairment from alcohol. Fortunately this has been done by several investigators in various countries, and the number of drinking people studied has been, not several hundred, but several thousand. These studies have been reviewed by two competent committees in this country. These groups are the American Medical Association's Committee on Street and Highway Accidents,[3] and the National Safety Council's Committee on Tests for Driver Intoxication.[4] The conclusions and recommendations of these two committees are identical. A number of the members of these committees have conducted research in this field for many years.

In proposing a reasonable and just plan for interpreting body alcohol figures the committees followed three general principles:

1. In using chemical tests one should strive to protect not only the non-drinker, but also the mild drinker who has not imbibed sufficiently to lower his driving ability.

2. Errors of interpretation, if any, should favor the person being tested.

3. While, with most people, the degree of intoxication is closely proportional to the per cent of body alcohol, provision should be made for the fact that some people do "carry their liquor"

[3] J. Am. Med. Assn., 112: 2164, 2175 (1939); 117: 653 (1942); 142:523 (1950).

[4] National Safety Council, Committee on Tests for Intoxication, 1938 Report, pp. 7-12, 1939 Report, p. 5 , and later reports.

better than others. This means that one cannot arbitrarily choose a certain point in the blood alcohol range and say that above this all drivers are under the influence, and that below it all are not affected. Recognition of this principle was the reason for providing the middle zone in the classification of drinking drivers.

With these principles in mind the above-mentioned committees agreed upon two limiting figures of blood alcohol concentration, one a low level, below which practically no one would be affected, and a second level, considerably higher than the first, above which all drivers are under the influence.[5] These two blood alcohol figures are 0.05 (1/20) per cent and 0.15 (3/20) per cent. Note that the second is three times the amount of the first. This arrangement divides drinking drivers into three groups as regards blood alcohol concentration. The three zones and the interpretations recommended by these committees are now described, and are shown graphically in Fig. 47.

ZONE I. Blood Alcohol from 0.0 to 0.05 (1/20) per cent

As shown by numerous experiments almost no one in this zone will be affected by alcohol. The highest point in this zone represents the accumulation of alcohol corresponding to two ounces of whiskey for a 150 pound person. It is recommended that a blood alcohol in this zone shall be considered prima facie evidence that the driver was not under the influence.

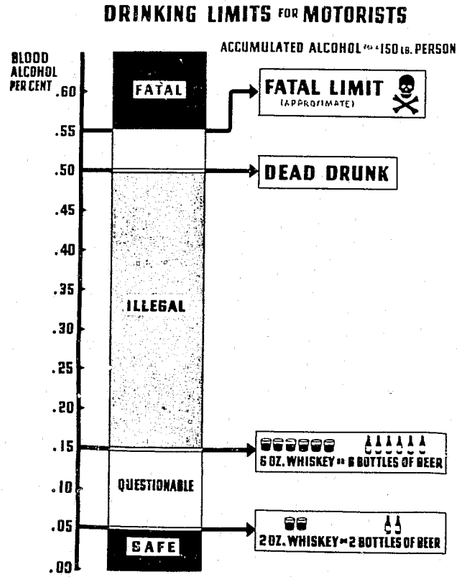
ZONE II. Blood Alcohol from 0.05 (1/20) to 0.15 (3/20) per cent

In this zone some drivers will be under the influence, but not all. Of those with blood alcohols slightly above 0.05 per cent only a few will be affected, and the fraction affected will rise with increasing blood alcohol, so that all will be affected before the blood alcohol reaches 0.15 per cent. In this zone the evidence of chemical tests should be considered relevant, but not prima facie, evidence that the driver was under the influence. If the usual physical signs are present, the driver should be prosecuted, and then chemical tests will furnish valuable corroboration.

ZONE III. Blood Alcohol above 0.15 (3/20) per cent

The above-mentioned committees recommended that a blood alcohol in this zone should be considered prima facie evidence that the driver was under the influence. The lowest blood alcohol in this zone means that for a 150 pound person a total quantity of absorbed body alcohol is represented by 6 ounces of 100 proof whiskey. To reach this alcohol level the person would need to drink more than 6 ounces

[5] Interpretation of Chemical Tests for Intoxication as Recommended by the American Medical Association and the National Safety Council. Laws embodying this interpretation have been passed by Indiana, and about twenty other states.



Source: Dr. R. N. Harger, in *Journal of Criminal Law and Criminology*, Sept.-Oct., 1944, Vol. 35, No. 3, p. 202. Reproduced with permission.

of whiskey, because some of the alcohol would be "burned" during the period of absorption. Even heavy drinkers agree that six ounces of whiskey taken on an empty stomach is no mere "eye-opener." Studies carried out by the Northwestern University Traffic Institute show that a driver whose blood alcohol is in ZONE III has increased his chance of having an accident 55 times, which is an increase of 5500 per cent.

Fairness of the Interpretation of the Three Zones of Blood Alcohol

The upper limit of ZONE I is 0.05 (1/20) per cent of blood alcohol. This limit is admittedly somewhat liberal, because there are a few people for whom two ounces of whiskey on an empty stomach would produce a transitory decrease of driving ability. At present, however, the public will be more inclined to accept the test results, if the interpretation is not too strict. Furthermore, it is generally agreed that in this zone the increase of accident hazard is very mild compared with the results observed in the other two zones, particularly ZONE III.

ZONE II extends from the upper limit of ZONE I to a blood alcohol 300 per cent higher. This is, therefore, a broad zone and its upper limit can be reached only after quite heavy drinking. Since the test results in this zone are used merely to confirm the usual sign of intoxication, it is difficult to see how anyone could object to the use as recommended. Many authorities believe that the upper limit of this zone should be 0.1 per cent of blood alcohol, so it is evident that the upper limit of 0.15 per cent, which is 50 per cent more than 0.1 per cent, is amply conservative.

As regards ZONE III, the only vital question here is whether there are some individuals who are so little affected by alcohol that it requires more than 0.15 per cent of blood alcohol to lower their driving ability. The answer is that this point has been repeatedly investigated, and no such person has been found. A few people do not stagger or exhibit thick speech until the blood alcohol reaches perhaps 0.25 per cent, but all of the hardy drinkers tested have shown a definite lowering of driving skill when the blood alcohol reached 0.15 per cent. In fact, all were somewhat adversely affected when the blood alcohol was above 0.1 per cent. Judgment is the first body faculty to be affected by alcohol. Judgment warped by alcohol is a far greater cause of highway crashes, than is simple clumsiness of muscular action. The alcoholic driver generally takes chances, which the normal person would avoid.

A few writers in this field have objected to the recommended interpretation for ZONE III on the ground that it is unfair to expert drivers. They agree that all drivers are impaired by blood alcohol above 0.15 per cent, but they argue that a very skillful driver may drink to the point where he loses half or more of his driving skill and yet operates a car better than certain very clumsy

drivers who never indulge in liquor. They propose to call a driver under the influence only if he has lowered his operating skill below that of the poorest driver permitted on the highway! If we accept this strange philosophy of the administration of justice, then we should exempt our more skillful drivers from obeying speed laws and stop signs. The reason we require all drivers to obey speed laws and stop signs is to prevent each driver from increasing his individual chances of a collision. Furthermore, this theory ignores the matter of judgment, and faulty judgment produces more crashes than does lack of skill.

Some people have insisted that the prima facie feature for ZONE III would be illegal in those states which define under the influence as not driving in the manner of a "reasonable and prudent man." Prudence is just another name for judgment, and drivers in ZONE III have pretty well cast prudence to the wind.

It has been argued that the term prima facie as used in this legislation is too rigid as regards interpretation. Perhaps the meaning of this term has been misunderstood. Competent attorneys tell me that prima facie does not mean certain or absolute, but that in law it means about the same as presumptive, or unless proved to the contrary. If this is correct, the term is certainly not a rigid one. For example, where the judge feels that the evidence against intoxication is strong enough, he is not compelled to make a finding of guilty, even though the evidence shows that the blood alcohol was above 0.15 per cent. However, experience indicates that this exception should be made very rarely.

It is true that the shock of an accident or the sight of a policeman may cause some inebriated people to sufficiently "pull themselves together" so as to temporarily conceal their real condition, even though they were driving with reckless abandon shortly before the collision. This point is too frequently overlooked by our courts.

Can the Tests Be Used in the Absence of Specific Legislation?

This point is frequently raised by officials who would like to employ these tests but fear that laws must be passed to make the evidence admissible in court. About 24 states have passed this type of law. In each state the law contains practically the exact features proposed by the National Safety Council and the American Medical Association. However, in many states having no such laws, chemical tests for intoxication are being routinely used, and the evidence is accepted by the courts. Cases involving chemical tests for intoxication have gone to the supreme courts of Iowa, Ohio, Wisconsin, Massachusetts, and Indiana, and in no instance has the high court questioned the reliability of such tests or the admissibility of this evidence, if legally obtained. After all, these chemical tests for alcohol are in the same class as all

scientific information relating to a court case. For example, all of our courts admit the testimony of a competent chemist in cases of alleged poisoning. Yet, I know of no state which has specified the particular method of analysis which the chemist must use, or which, by law has defined the fatal concentration of arsenic or other poison in the body. Expert testimony is employed to show whether the death was caused by a given poison.

The advantage of laws defining the limits of body alcohol for automobile drivers is that in this way much time is saved by eliminating arguments over interpretation of the results, and the state avoids the trouble and expense of calling an expert witness for each drunken driving trial. In other words, legislation is desirable but not indispensable.

Compulsory Tests

Can a driver be compelled to submit to a test against his will? On this point the legal profession has shown considerable divergence of opinion. In two states the attorney generals have approved the use of force, while in at least two other states these officials have emphatically denied the admissibility of the results of body alcohol tests obtained without the consent of the driver under investigation.

In this connection, an important point is the amount of force required to obtain the sample of body material which is to be analyzed. On this score the tests may be divided into three groups:

1. Materials secured by invading the body. This would include blood, spinal fluid, and urine obtained by means of a catheter. To secure blood or spinal fluid it is necessary to puncture the body; and passing a rubber tube into the bladder would also be an invasion of the person's body.

2. Specimen which the suspected person may easily produce. Examples would be urine, saliva, or breath collected in a suitable container. Compulsion here would be to require the suspected person to produce the specimen.

3. Collection of discarded body materials. Here the suspected person is not required to perform any voluntary act, although he may be subjected to temporary restraint. To obtain a sample of urine the person is placed in a cell with a dry urinal opening to the outside. Eventually nature will require him to empty his bladder, and the urine sample is secured. As regards breath, the writer's "drunkometer" test may be run on breath as it leaves the nose or mouth, by drawing this exhaled air through the apparatus. The results are just as reliable as when the subject blows into a rubber bag. The person being tested is not required to move a muscle, but he will eventually have to breathe, and the test can be run.

This type of compulsory breath test has been accepted as evidence in a number of courts in Indiana. The following case is an example: On June 3, 1937, an Indianapolis woman drove her car through a safety zone, injuring several people and killing a baby which had been in the arms of its mother. The offending driver did not stop, but she was apprehended a few minutes later. Shortly afterwards the prosecutor telephoned me and requested that I go to the jail and run a breath test on this woman. When I reached the jail, I found there a drink crazed woman who was alternately weeping and cursing. She vehemently refused to take the test. Thereupon two policemen seated her in a chair and held her there while I ran the test. I did not touch her but simply operated the apparatus to suck breath through it during each outgoing breath. It proved wise not to get too near her, because during the test, she kicked one policeman in a rather vulnerable spot. The test showed that her blood contained a little over 0.2 per cent of alcohol, and she was arrested for manslaughter. When I testified at the trial some months later, her lawyer showed from my testimony that the test was taken against her will. He then objected to the admission of this evidence on the ground that it was a violation of his client's constitutional rights. The judge, James W. Emmert of Shelbyville, who is now Attorney General of Indiana, then questioned me closely as to the details of the test, after which the judge overruled the objection and admitted my testimony regarding the test. In his ruling the judge said, in substance, that the woman had not been compelled to perform any act, that she was not even forced to breathe, and finally that when the breath leaves the body it becomes common property anyway. The verdict was guilty, and the woman served a term in the Indiana Woman's Prison. We hoped and prayed that this case would be carried to the Indiana Supreme Court; but, unfortunately, it was not appealed. If finger prints or photographs may be taken without a person's consent, then it would seem legal to obtain a sample of his breath after he is through with it.

From a practical standpoint compulsory tests will probably not accomplish a great deal more than when the tests are on a voluntary basis. Our experience in Indiana, and reports from other states, indicate that only a small per cent of drivers object to being tested. As a matter of fact, most drivers under the influence of alcohol have lost all sense of caution and readily submit to these tests. In Ohio a refusal to submit to such a test may be used in evidence at the driver's trial.

We should perhaps mention two proposals for securing the driver's consent for these tests in the event they are needed. The first is to require such consent, in writing, in order to obtain a driver's license. The second is to make revocation of the driver's license mandatory, if the holder refuses to submit to a chemical test, when such a test is required and requested by the proper authorities. The result would be to place these tests on the same basis as so-called compulsory premarriage blood tests, which are

required in many states. Even with these premarriage blood tests, the state cannot forcibly bleed the prospective spouse, but it can withhold the license until the test is performed and the results are satisfactory.

Those interested in this phase of the subject would do well to read the excellent reviews by Inbau[6] and Ladd and Gibson.[7]

Qualifications Required for Persons Conducting the Tests

Any chemical analysis is worthless unless it is performed with reasonable accuracy. False results regarding body alcohol may cause a serious miscarriage of justice, or be the means of discrediting a test program. Therefore, the tests should be conducted only by persons who are trained to perform them in a satisfactory manner. This does not mean, however, that a college degree in chemistry is required in order to operate all of these chemical tests. Some of the test procedures are extremely simple; some a little more difficult could be easily run by a high school chemistry student, and others should be operated only by an experienced chemist.

In any case the prospective operator should be selected and trained by a competent chemist. The operator should not be permitted to run the test for court use until he has successfully passed his training course, which should include the running of "unknowns" as well as many tests with human subjects to demonstrate that he is qualified to make the analysis without help. The instructor should be "hard-boiled" and refuse to "OK" any student who cannot meet the necessary requirements.

The state police of Indiana have used the writer's breath method for the last seven years. The training of their test operators is described by Superintendent Don Stiver in the February, 1944, issue of Public Safety. The personnel of the Indiana State Police is mostly made up of young men who rank comparatively high in intelligence. The prospective test operators are selected because of previous training in chemistry, photography, or other technical subjects. Each summer the writer conducts an extensive course for these test operator candidates. The course includes lectures and a good deal of laboratory practice. Only those who successfully pass the course are permitted to become test operators. A good share of the candidates may fail. Those who are certified to run the test are placed under the supervision of the chief technician at Indianapolis. The chief technician sends out occasional "unknowns" to check on these operators, and at intervals the operators are called to headquarters for review tests. During

---

[6] Fred E. Inbau, Self-Incrimination--What Can an Accused Person Be Compelled To Do? The American Journal of Police Science, incorporated in The Journal of Criminal Law and Criminology, Vol. XXVIII, No. 2, July-August 1937

[7] Mason Ladd and Robert B. Gibson, The Medico-Legal Aspects of the Blood Test to Determine Intoxication, The Iowa Law Review, Vol. XXIV, No. 2, Jan., 1939.

the past two years these operators ran chemical tests resulting in about 2500 prosecutions for driving while under the influence, with 97 per cent convictions. In difficult cases these technicians require the aid of a physician or other qualified person to present expert testimony regarding the interpretation of the test results and the validity of such tests.

The police departments of a few of our states and some of the larger cities are fortunate enough to have the services of men with college degrees in chemistry, but this is the exception rather than the rule. Science is rapidly replacing "hunches" and the third-degree in police work, and the day is not far distant when our police laboratories will attract scientific men of high caliber with university training along this line. However, this will not happen until the authorities make the salaries high enough to attract really good men, and the pay will have to be far more than that of the average patrolman.

For the present, many law enforcement agencies must get along with technicians who are trained and directed under competent supervision. In most communities a high school or college chemistry teacher or local industrial chemist could supervise the test operator and check chemical solutions, etc. World War II has amply demonstrated that many people, with little or no technical background, can be trained to operate machines and instruments of precision in a satisfactory manner. Another example emphasizing this point is the widespread use of the Babcock test for determining butterfat in milk and cream. This test was devised in 1890 by Dr. Stephen Babcock of The University of Wisconsin. It is simple and accurate, and many people who do not even have a high school education have learned to run this test properly. A number of states examine and license these Babcock test operators, and the results have been highly satisfactory. Almost none of these test operators are college graduates. The general use of the Babcock test has probably done more to improve the dairy industry than any other development in its whole history. To have restricted the operation of the Babcock test to graduate chemists would have denied the benefits of this test to many communities.

As regards drunken driving, thousands of these cases must be decided every month, and if chemical tests run by available technicians will eliminate some of the guesswork involved in settling these cases, then such tests will serve a useful purpose.

Selection of Test Method

Advice on this point is a little like trying to tell a man which insurance company to patronize or what make of car to buy. Regardless of the choice, the results achieved are about the same. A large number of test methods are available. A recent publication

of the National Safety Council[8] listed six recommended methods, and a number of others may be found in the technical literature.

The method chosen will depend upon the test operator's personal preference, his training and experience, and the facilities available in his department. As already mentioned, the results of all the test methods yield about the same final information. As regards the six test methods listed by the National Safety Council, the Council's Committee said, "The Committee is of the opinion that any one of the methods is capable of giving quite satisfactory results."

Choice of Body Material To Be Analyzed for Alcohol

We have already pointed out that with living subjects the body materials available for chemical analyses are blood, urine, saliva, spinal fluid, and breath.

Breath is probably the easiest body material to obtain. Two of the breath analytical methods available may be completed within five minutes, which makes it possible to know quickly whether to hold the driver. The results of breath analyses will probably not predict brain alcohol quite as closely as will blood analyses, but our experience with thousands of breath analyses indicate that the results are sufficiently accurate for practical purposes. In borderline cases one should perhaps also analyze one of the other body substances.

Saliva is also easy to obtain. Only a small amount is necessary, and any officer is capable of collecting the sample and forwarding it to a chemist. However, there is often some delay before the results of the chemist's analysis are ready. I believe that saliva should be used much more generally than it is at present.

Urine has been widely used, and the results are generally very satisfactory. As pointed out by Southgate and Carter[9] of England, it is occasionally found that an inebriated individual will not, or cannot, urinate when requested to do so. If the bladder had not been emptied for several hours this urine may show a lag in alcohol as compared with blood. In such cases the driver should be instructed to empty his bladder and a second sample should be collected after about fifteen minutes.

In Sweden and other parts of Europe, and in some places in the United States, blood is the test material used. Only a physician or a competent clinical technician should be permitted to draw blood from living subjects. This service is sometimes difficult to obtain. If there is a delay of two or more hours between the

---

[8] Chemical Tests for Intoxication, Committee on Tests for Intoxication, 1938 report. Street and Highway Traffic Section, National Safety Council, Chicago, Illinois

[9] Southgate, H. W., and Carter, G., Excretion of Alcohol in Urine, Brit. Med. Jour. 1:463, March 13, 1926.

accident and the drawing of the blood sample, this will mean a considerable drop in the per cent of blood alcohol. When drawing a blood sample, alcohol must never be used to sterilize the skin or the hypodermic needle and syringe. A preservative should be added to the blood sample to prevent loss of alcohol upon standing. A good preservative is sodium fluoride, about one-half grain per drachm of blood. In death cases it is usually possible to obtain a blood sample without opening the body. One way to do this is to draw blood directly from the heart by means of a hypodermic syringe fitted with a long spinal puncture needle. With a little practice it is fairly easy to insert the needle between the ribs above the heart. This procedure is frequently carried out by the corner's deputies in Indianapolis.

In death cases the blood sample should always be drawn before embalming is started. Otherwise, the sample will be contaminated with formaldehyde, wood alcohol, and sometimes grain alcohol, and will be useless. We have repeatedly encountered this trouble. If the embalming fluid used contained no grain alcohol, it is possible to do a long analysis which will yield reliable results, but the method is too complicated for general use by most laboratory technicians. We have received blood samples which were taken from the first blood which was drained from the body during embalming, but these too contained some formaldehyde, etc. The best practice is to have the coroner refuse to release the body to the undertaker until the blood sample is obtained. Embalming fluid bottles should not be used as containers for blood, even though they are well washed, as the cap linings usually contain embalming fluid. With blood samples received from death cases, we routinely test the blood for formaldehyde, and if it is present we reject such a sample.

Chemical Tests for Intoxication Follow Well-Established Principles of Medicine and Law

In 1814 the French chemist, Orfila, pointed out that when death is caused by a poison, such as arsenic, the body organs will contain demonstrable amounts of the poison. During the 130 years since Orfila's time, many chemists have improved and extended the methods of analyzing body materials for poisons. This type of technical information is now so well accepted, that at present practically all physicians and all courts would consider evidence of poisoning as questionable, unless it is supported by the results of a chemical analysis. The most reliable proof of poisoning is the chemist's report that he found the poison present, and in sufficient quantity to have caused death, excluding, of course, the addition of poison after death. Thus, in cases of suspected poisoning by carbon monoxide, strychnine, arsenic, lead, wood alcohol, barbiturates, etc., it is largely the chemist's analysis which settles the matter. These chemical tests are also frequently made on body materials from living persons, who are possibly suffering from the effects of

poisons or strong drugs. Here, also, the chemist's report has much more weight in medicine or law, than would be given to the opinion of non-medical witnesses who simply observed the behavior of the person in question.

The victim of alcoholic intoxication is really suffering from the effect of a drug, and that drug is ethyl (grain) alcohol. It is certainly logical to apply here the same procedures for proving drug action as are used for other drugs. Chemical tests for intoxication are, therefore, just another application of the customary use of scientific tests to tell whether the person in question is suffering from the effect of a drug or poison.

It is true that most courts have held that any person may testify as to whether, in his opinion, a given individual was drunk. However, this rule was made long before the automobile appeared, and in a time when "drunk" meant a very advanced state of inebriation. An automobile driver must be very drunk before most eyewitnesses are willing to testify in court that he was intoxicated. The other party in the collision is perhaps an exception to this rule, but his testimony often carries very little weight.

Will the Use of Chemical Tests Aid in Reducing Drunken Driving?

Drunken driving is one of the most hazardous traffic law violations. This does not mean that most of the crashes are caused by intoxication, for the reason that other traffic law violations far exceed drunken driving. Just what fraction of our total so-called automobile accidents is caused by intoxication is difficult to estimate, but the evidence is overwhelming that inebriated drivers have many times their share of the crashes.

The problem of preventing a drinking man from driving is not an easy one. With his judgment distorted by alcohol he frequently does not realize his condition, or if he does, he has ceased to be concerned over the safety of himself or others. In spite of fines, suspensions of driver's license, and even imprisonment, all communities have drivers who are repeatedly guilty of drunken driving. With some people the urge to imbibe is very strong, and it sometimes seems a hopeless task to prevent them from fulfilling this urge just before driving.

Here, as with all other types of lawlessness, stricter law enforcement results in better observance of the law. If this is not true, then we are wasting a lot of money on police, prosecutors, and courts.

It is a well-accepted axiom that promptness of apprehension and certainty of punishment are the best insurance against law violations. Drunken drivers cannot be penalized unless they are apprehended and convicted, and it is here that chemical tests for intoxication are urgently needed.

In order for a chemical test program to be most effective the public must know that such tests are available and are being extensively used. When police departments will take the time to run chemical tests for intoxication after every crash, routinely test all drivers and pedestrians involved, and if the courts will vigorously support this program, then drunken driving will decrease.

While chemical tests for intoxication will not necessarily insure honest, vigorous and continuous law enforcement, they can be of greatest assistance to officials who really desire to do their duty in curbing the menace of the drunken driver. These chemical tests should not be used to exclude the usual type of evidence of intoxication, such as the testimony of eyewitnesses, but these tests will give valuable additional information which is often sorely needed.

SOME LEGAL PROBLEMS IN "DRIVING UNDER THE INFLUENCE" CASES

Jack R. DeWitt, Executive Secretary,
Wisconsin State Judicial Council

Section 85.13 (1), Wisconsin Statutes, 1949, provides: "It shall be unlawful for . . . any person who is under the influence of an intoxicating liquor . . . to operate any vehicle . . . upon any highway." The Wisconsin court has defined the phrase "under the influence" as such a mental and physical condition as appreciably interferes with a driver's use of ordinary care in the management of his car.[1] The court has pointed out in a criminal case that the statutory standard is being "under the influence" rather than being "drunk."[2] However it has said in previous civil actions that in insurance policies "influence of intoxicants" means the same thing as "intoxication."[3]

Beer has been held to be an intoxicating liquor for purposes of section 85.13 (1).[4]

Operation of a vehicle while under the influence of intoxicating liquor must occur on a highway to constitute the offense. If violation of a county ordinance against operating a vehicle while under the influence of intoxicating liquor is alleged, the highway upon which the operation took place must be one which is maintained by the state, by the county, or both the state and county.[5]

Proof Required

It is apparent from the foregoing statements that to secure a conviction under section 85.13 (1), or a forfeiture under a county ordinance couched in similar language, the following proof must be made:

1. That the accused was operating a vehicle upon a highway within the jurisdiction;

2. That the accused was at such time and place in such a mental and physical condition as to appreciably interfere with his use of ordinary care in the management of his vehicle; and

3. That such mental and physical condition of the accused was caused by his consumption of intoxicating liquor.

---

[1] Steinkrause v. Eckstein; 170 Wis. 487, 175 NW 988 (1920). See also Bakalars v. Continental Casualty Co., 141 Wis. 43, 122 NW 72 (1909).
[2] State v. Hanks, 252 Wis. 414, 31 NW (2d) 596 (1947).
[3] Bakalars v. Continental Casualty Co., supra note 1 and Kuroske v. Aetna L. Insurance Co., 234 Wis. 394, 291 NW 384 (1940).
[4] 31 O.A.G. 199 and cases cited therein.
[5] 31 O.A.G. 184.

Whether the accused was operating the vehicle, and whether it was on a highway within the jurisdiction can usually be established by testimony of the arresting officer. or, if he does not have personal knowledge, by other eye witnesses.

The mental and physical condition of the accused can be established by the arresting officer or other lay persons who observed him operating the vehicle, immediately before operating it, or immediately after operating it. Coordination tests, etc. given by experienced police officers may be very important in the trial, providing the tests are administered reasonably soon after the alleged violation.

Doctor-Patient Relationship

A doctor who has examined the accused may testify as to the physical and mental condition of the accused at the time of the examination, provided there is no doctor-patient relation so as to give the accused the privilege of forbidding the doctor to testify under section 325.21, Wisconsin Statutes, 1949. It is again vital how close in point of time this examination is to the alleged operation while under the influence. Because they usually are more experienced than lay witnesses in observing physical and mental state and in noting specific aberrations from the normal, doctors should make excellent witnesses in this respect.

A doctor who has examined the accused can further testify, subject to the privilege accorded the accused by section 325.21,[6] as to whether in his expert medical opinion the mental and physical condition of the accused was caused by his consumption of intoxicating liquor.

A lay witness who has had the opportunity to observe the facts upon which he bases his opinion may also testify as to whether in his opinion the accused was intoxicated at a particular time.[7]

A person qualified to analyze medically or chemically the breath, blood, urine, or saliva of the accused can give expert testimony as to the alcohol content of the blood of the accused.[8]

[6] City Racine v. Woiteshek, 251 Wis. 404, 29 NW (2d) 752 (1947) and Green Lake County v. Domes, 247 Wis. 90, 18 NW (2d) 348 (1944).

[7] Kuroske v. Aetna Life Insurance Co., supra, note 3.

[8] Sec. 85.13 (2) Wisconsin Statutes, 1949 provides: ". . . the court may admit evidence of the amount of alcohol in the defendant's blood taken within two hours of the time of the arrest as shown by a medical or chemical analysis of such defendant's breath, blood, urine or saliva . . . " Even before this statute was enacted, Wisconsin had admitted evidence of the alcohol content of a blood sample in the Kuroske case, supra note 3.

This is highly relevant since research has definitely established that certain concentrations of blood alcohol will place any normal human being in such a mental and physical condition as to appreciably interfere with his use of ordinary care in the management of his vehicle. While the alcohol carried by the blood stream to the brain is the thing which impairs the ability of the accused to use ordinary care in the management of his vehicle, science has established relationships between the content of alcohol in the brain and the content in the blood stream, the urine, spinal fluid, and breath.

Defense Attorneys and Tests

Since these tests can be so helpful in establishing whether an accused was under the influence of intoxicating liquor, in what ways have defense attorneys endeavored to negate the effect of a test which indicates that the accused was driving while under the influence?

Defense attorneys have attempted to keep the results of such tests from being admitted at trials on the grounds that the evidence was illegally obtained because it was had by unreasonable search or seizure; that admission of such evidence would compel the accused to be a witness himself in a criminal case; or that admission of the evidence violates the privilege of a patient to forbid his doctor to disclose information obtained through their professional relationship.

If the court admits the results of the tests in evidence, the defense may, of course, attack the validity of the tests by questioning the integrity of the sample of body material, the competency of the person running the test, or the adequacy of the equipment used to run the test. A further line of attack is open to the defense attorney in that he may deny that the admitted result of the test (as to the alconol content of the blood) establishes that the defendant was under the influence of intoxicating liquor.

If the sample of body material is properly collected so as not to be adulterated by foreign matter and is properly sealed, marked, and transmitted so that its identity is readily established, and if a thoroughly competent person makes the properly conducted test with adequate equipment, the defense should have a very difficult time denying that the amount of alcohol shown by the test was present in the blood at the time the sample was taken. If the test is run in this manner, any other chemical test which the defense might run would show approximately the same result if the sample is unadulterated and if the test is run by a qualified person with proper equipment.

The defense may, of course, have lay witnesses or perhaps a doctor who observed the accused close to the time of the alleged

offense who will testify that in their opinion the accused was not under the influence of intoxicating liquor. This testimony must, of course, be weighed against the result of the particular test if it is admitted into evidence and the wealth of experimental data available as to the relation between blood alcohol and the ability to coordinate the nervous and muscular systems of the body.[9] This experimental data should also make it difficult for the defense successfully to contend that the accused has some physical abnormalities which make it possible for him to have a high content of alcohol in his blood and still not be under the influence of intoxicating liquor.

The Attack on Admissibility

The most interesting defenses from a legal standpoint are not the attacks upon the validity of the test to show the content of alcohol in the blood, or upon the relevancy and weight of the test result to establish that the accused was under the influence, but rather the attack upon its admissibility into evidence.

The Fifth Amendment to the Federal Constitution gives a privilege against self-incrimination which extends only to federal courts, but Article I, section 8 of the Wisconsin Constitution states: "No person . . . shall be compelled in any criminal case to be witness against himself . . . "

Historically this right extended only to testimonial communications demanded of the accused in court; it was an outgrowth of the feeling against the ruthless conduct of the trial by inquisition on the part of the Court of the Star Chamber.[10] In the case of Green Lake Co. v. Domes,[11] in which the accused was examined against his will by a doctor, the court held that allowing the doctor to testify as to whether the accused was drunk or sober was permissible. Counsel for the accused contended that this compelled the accused to be a witness against himself, but the court indicated that the constitutional privilege was not violated since no communication or testimonial evidence was extorted from him which was prejudicial in his case.

Since a test for blood alcohol requires no communication whatsoever from the accused, it seems clear that results of the test cannot be kept out of evidence on the ground that the accused is compelled to be a witness against himself.

In situations where the body matter sample is taken by a doctor, the defense may demand that the test result be excluded because of the privilege of a patient to forbid his doctor to disclose

[9] See 24 Iowa Law Review 191 and articles cited therein.
[10] See excellent discussions by Ladd & Gibson in 24 Iowa Law Review 191 at 226 and by Wigmore in 8 Wigmore on Evidence (3rd Edition) section 2263.
[11] Cited supra note 6.

information obtained about the patient through his professional relationship.[12] Whether this tactic will avail the defense anything depends generally upon whether there is in fact a doctor-patient relation between the doctor and the accused. In City of Racine v. Woiteshek,[13] a doctor examined a defendant for intoxication at the request of the police and was permitted to testify. The court upheld this on the ground that a doctor is prevented from disclosing only such information as is "necessary to enable him professionally to serve such patient," and since the purpose for examining the defendant was to ascertain his sobriety rather than to "professionally serve such patient," the information obtained through the examination was not privileged. It was admitted in this case that the doctor would have given emergency treatment to the defendant if it had been required.

Despite the statement of the court about limiting the privilege to information "necessary to enable him professionally to serve," it should be borne in mind that there was quite clearly no doctor-patient relation established. The doctor was engaged by the officer, and there was in fact no emergency treatment given. If there were, however, a clear doctor-patient relation and the doctor furnished the police a sample of the accused's urine or blood, it would still seem that this is not disclosing information necessary for him to serve his patient professionally; therefore, the result of the test should be admissible in evidence.[14]

Illegal Obtention of Evidence

A more troublesome defense than either the alleged violation of the constitutional privilege against self-incrimination, or the alleged violation of the statutory privilege of a patient to forbid his doctor to testify is that of contending that evidence of the test result is inadmissible because it was illegally obtained. It is usually maintained that it was illegally obtained because it violates the right to be secure against unreasonable searches and seizure.

It is well established in Wisconsin that evidence which has been illegally obtained is not admissible at trial.[15]

Article I, section 11, Constitution of Wisconsin provides the right to be secure against unreasonable searches and seizures. The question which must be answered in each case is whether the taking of the particular sample of body material constituted an unreasonable search or seizure.

[12] Section 325.21, Wisconsin Statutes, 1949.
[13] Cited supra note 6.
[14] See 24 Iowa Law Review 191 at 251; see also a note in 24 Iowa Law Review 538.
[15] State v. Wuest, 190 Wis. 251, 208 NW 899 (1929) and State v. Warfield, 184 Wis. 56, 198 NW 854 (1924)

This privilege was established to protect homes from being ransacked under warrants issued without the name of the person or thing for which search was being made, to give persons security in their possessions, and to protect people from being searched personally without reason.[16] It seems that this should not apply to disclosure of the physical condition of the accused, provided he has been placed under lawful arrest.

Statutes in Wisconsin give city policemen and county traffic patrolmen the authority to arrest without warrant persons violating laws in their presence.[17] A sheriff has been held to have a similar power.[18] Once a defendant has been properly arrested he can be subjected to a reasonable search.[19]

What is a Reasonable Search?

It is hard to say what is a reasonable search. How much physical invasion of the person is permitted? In Green Lake County v. Domes[20] a compulsory physical examination to determine intoxication was held to be permissible. It does not seem an unreasonable invasion of the person of the accused charged with driving under the influence of intoxicating liquor to take a sample of discarded body material such as his breath or his urine. The court might feel differently about extracting urine from the accused by means of a catheter, or obtaining spinal fluid by a spinal puncture. In the latter instances the qualifications of the person securing the sample might be quite important. For example, the instance of a doctor securing the spinal fluid might be held reasonable, while that of a police officer securing the same sample might be deemed unreasonable. The writer has found no Wisconsin cases where the court has had the question directly before it of whether obtaining a sample of body material against the will of the accused, for the purpose of a test for alcohol in his blood is an unreasonable search.

It seems quite clear that even if the taking of body material were an unreasonable search, the accused can waive his constitutional privilege by consenting to the search. Thus if the accused consents to submit to the test, his counsel should not be permitted to keep it out of evidence on the ground that it was illegally obtained. The consent must, of course, be voluntary.

Wisconsin has held that consent to make a search was not necessarily involuntary just because it was made at the instance of an officer.[21] Exactly what constitutes a voluntary consent is,

[16] 24 Iowa Law Review 191 at 215.

[17] Section 62.09 (13) Wisconsin Statutes, 1949, as to city police and section 83.016 ibid. as to county traffic patrolmen.

[18] Hoch v. State, 199 Wis. 63, 225 NW 191 (1929).

[19] Scaffido v. State, 215 Wis. 389, 254 NW 651 (1934) and State ex rel Tessler v. Kubiak, 257 Wis. 159, 42 NW (2d) 496 (1949).

[20] Supra, note 6.

[21] Gray v. State, 243 Wis. 57, 9 NW (2d) 68 (1943).

however, a very ticklish question.[22] If the officer tells the accused he "has to submit to the test" the court would probably hold that consent was not voluntary, and if the search were held unreasonable, the test result would be inadmissible. There is no duty, however, on the part of the person obtaining the sample to warn an accused of his privilege against unreasonable search or his right to counsel.[23]

Summary of Considerations Involved

If a case comes before the Wisconsin Supreme Court where a sample of body material was taken for a blood alcohol test, the following considerations will probably be important in determining the admissibility of the test results:

1. Was there a legal arrest?
2. Did the accused consent to giving the sample?
3. Was such consent voluntary?
4. If the accused did not consent or if his consent was not voluntary, did the treatment the accused was subjected to, in the taking of the sample, amount to an unreasonable search?
5. If a doctor took the sample was there a doctor-patient relation, and did the doctor's furnishing the sample for test purposes constitute a disclosure of information necessary for him to serve the accused professionally?[24]

[22] See State v. Gibbs, 252 Wis. 227, 31 NW (2d) 143 (1948).

[23] See Link v. State, 217 Wis. 582, 261 NW 416 (1935); State v. Whatley, 210 Wis. 157, 245 NW 93 (1933); Tarasinki v. State, 146 Wis. 501, 131 NW 889 (1911)

[24] It should be borne in mind that the statutory privilege applies only to doctors and not to nurses and medical technicians. Prudential Insurance Co. v. Kozlowski, 226 Wis. 641, 276 NW 300.

BIBLIOGRAPHY

24 Iowa Law Review 191

Journal of Criminal Law:

28 - 2

35 - 202

36 - 132

37 - 188

37 - 441

39 - 225, 402, 411

40 - 533

Dax & Tibbs, Arrests, Searches, and Seizures, 1950
Hammersmith - Kortmeyer Co.

Perkins, Elements of Police Science, 1942
The Foundation Press

41 Wisconsin Law Review 249

PUBLICATIONS OF THE BUREAU OF GOVERNMENT

Manual for the Institute on Wisconsin Municipal Law, 1948
(Out of Print)

Manual for the Institute on Public Library Management, 1948. 35¢

Manual for the Institute on Administrative Procedures for Wisconsin County Treasurers, 1949 (Out of Print)

Manual for the Second Annual Institute on Public Library Management, 1949. 35¢

Municipal Administrative Practice, A Course in Administrative Management for Wisconsin Municipal Executives and Other Policy-Determining Officers, 1949. $3.00

Manual for the Second Annual Institute on Administrative Procedures for the Treasurers of Wisconsin Counties, 1950. $1.00

Manual for the Institute on Administrative Procedures for Clerks of Wisconsin Counties, 1950. $1.50

Manual for the Institute on Administrative Procedures for Wisconsin County Traffic Enforcement Officers, 1950. $2.00

Manual for the Institute on Administrative Procedures for Registers of Deeds of Wisconsin Counties, 1950. $2.00

Manual for the Institute on Trends in County Finance, 1950. $1.00

State Administrative Practice, A Course in Administrative Practice for Wisconsin Departmental Executives, 1950. $2.50
Solutions to Case Studies in Above, $.50.

Manual for the Third Institute on Public Library Management, 1951. $1.00

Manual for the Second Institute on Administrative Procedures for County Traffic Enforcement Officers, 1951. $2.00

Manual for the Second Institute on Administrative Procedures for the Clerks of Wisconsin Counties, 1951. $1.25

Manual for the First Institute for Clerks of Circuit Court, 1951. $1.50

Manual for the Second Institute for Registers of Deeds, 1951. $1.00

Manual for the Third Institute for County Treasurers, 1951. $1.00

While the supply lasts, Wisconsin county officials may obtain copies of manuals of past county institutes without charge.

UNIVERSITY EXTENSION DIVISION
The University of Wisconsin

EXTENSION TEACHING

Correspondence Study: More than 400 courses are available, including college or university courses; high school courses, for credit toward the local diploma; and non-credit courses, designed for self-improvement and advancement along professional or vocational lines.

Extension Classes: Full freshman and sophomore class programs which enable students to complete their basic college work in the home community are offered, in addition to a wide range of late afternoon and evening classes for adults.

SPECIAL SERVICES

Package libraries, study aids, and a forensic association provide mediums through which the Bureau of Information and Program Services serves individuals and groups interested in the study and discussion of timely subjects.

Drama services are available through the Wisconsin Idea Theatre.

Visual aids, including sound and silent films, filmstrips, and lantern slides are available to schools and civic organizations through the Bureau of Visual Instruction.

Advice on photography may be obtained through the Photographic Laboratory.

Educational entertainment programs, lectures, and commencement addresses are offered to schools and organized civic groups through the Bureau of Lectures and Short Courses.

Management personnel of business and industry are provided with short courses by the Industrial Management Institutes.

Worker groups are served by special classes and institutes sponsored by the School for Workers.

Aid in psychological research and program development is provided for business, labor, industrial, and civic organizations through the Bureau of Industrial Psychology.

Engineering and technical personnel can keep abreast of the latest developments in their specialized fields through the Engineering Institutes.

Community counseling in regard to economic and social problems is available to individuals or groups in any Wisconsin community through the Bureau of Community Development.

Institutes and short courses in correctional administration and social work are provided by the Bureau of Sociology and Social Work.

Institutes for government officials and adult education in public affairs are provided by the Bureau of Government.

Business information and guidance is supplied upon request to the Bureau of Business Information.

Information concerning any Extension service as well as aid in organizing local class or study groups may be obtained locally through University field representatives or the Extension Center directors. For additional information and bulletins, write,

UNIVERSITY EXTENSION DIVISION, MADISON 6, WISCONSIN

END