A PRACTICAL GUIDE TO THE BASICS OF PHYSICAL EVIDENCE

A Reference Text for the Criminalist, Investigator, Student, and Attorney

CLAUDE W. COOK

CW-4 United States Army (Retired)
Formerly Commanding Officer
U.S. Army Crime Laboratory (Europe)
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With a Foreword by

Doctor Donald A. Torres

John Jay College of Criminal Justice
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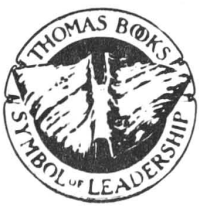

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FOREWORD

The criminalist or laboratory professional is a very necessary segment of the investigation process and the criminal justice system. It is scientific analysis and specialized expertise that often produces the necessary link from the defendant to the crime or, in other cases, provides testimony that may clear the innocent wrongly accused of the criminal act. In too many cases the investigator and laboratory specialist do not interact as often as they should, although each is related to the other in a very special way.

The investigator examines the crime scene for clues, evidence, or signs of specific *modus operandi* to solve the case or associate items to the suspect. The criminalist generally receives the residue of the investigator's labor for analysis, often not even conversing with him, when in fact they should have a very close working relationship. The criminalist or scientific evidence analyst is often called upon to perform miracles such as restoring contaminated or poorly collected evidence for presentation in court, to make comparisons of striations on projectiles and metals for positive associations to firearms or tools used by defendants, and to testify as an expert on various matters. The investigator and the laboratory expert are tied together in a special bond that culminates in the conviction of the criminal.

There are many texts on the market that deal with the specific area of evidence collection or evidence examination. Claude Cook wrote this book for a specific purpose, and that was to fill a void where he believed one existed. This text was written by a person who is a recognized criminalist with many years of experience. It was designed for use as an introduction or reference for those entering or already involved in criminal investigation, criminalistics, and other fields. This text was also designed to supplement other texts in the field and to give the reader several comprehensive sources to rely upon in the field of evidence collection and examination.

This material is concerned with areas that other publications have failed

to cover in depth and information that needs to be disseminated to those in the criminal justice system requiring such information. The uncomplicated style of Claude Cook's delivery allows the reader to understand the complicated material in a practical, commonsense fashion. Many of the practical problems raised in real investigative work are given in the text so the reader will be cognizant of such obstacles.

Claude Cook has taken precautions to include field "tips" on essential crime scene kit materials, proper casting of impressions, photographing of impressions and fingerprints, ballistics material, and lock entry information. He has also covered the function and use of microscopes and other examination equipment for laboratory use. Many items mentioned in the text are explained for use in the real world and for possible use in court hearings to enhance testimony. Claude has also given other references for use by professionals in the criminal justice system.

This text does fill a gap in the publications for those in search of specific material. The information contained within will also enhance the investigator's or individual's knowledge of the criminalistics field. The need for material to educate the professional never ends, nor is this material ever contained in one printed source. This text by Claude Cook will be of assistance to those seeking to fill the gap in other texts of this kind.

Doctor Donald A. Torres

PREFACE

Few people, myself included, bother to spend a great deal of time reading a preface or introduction to a textbook. This may be a basic flaw in our nature, but we are too intent upon getting to the meat of the book's subject matter to be overly concerned with what the writer wishes to tell us about it. This is particularly true when the text is to be used for reference rather than as the basis for a more complete course of instruction.

Regardless, it is hoped you, the reader, will spend the small amount of time required to peruse these opening remarks. By so doing, you may get a better understanding of why this book was written in the particular format that has been chosen and, by reason of this understanding, find it easier to locate specific topics.

PURPOSE AND SCOPE

Portions of this book will give reasonably complete coverage of the topic being considered; yet, other portions are devoted to background information of a more basic nature, which is intended to lay the groundwork for other studies you may have undertaken. The book has been broken down into sections and, with the exception of the glossary, is not designed purely as a reference text in the sense that a dictionary, thesaurus, or encyclopedia might be.

In the case of a dictionary, should we wish to define a word, confirm spelling, or find a synonym or antonym, we may turn directly to that word and obtain the needed information. We just don't read a dictionary from cover to cover, nor do we normally read the preface, the explanatory notes, or much of the other material in the book. As a point of fact (and for the reasons just stated), not many of us are aware of the wealth of information contained in a dictionary.

Be that as it may, this particular book is written as a series of monographs covering material listed in the Contents. Some of this material will be covered in detail, whereas other material will be less completely covered; the coverage given will correspond, generally, to what the reader needs to know to get the job done. With a few exceptions, this is not written as a "how to" book, nor is it a text in which the groundwork is laid in one chapter for material to be covered in subsequent chapters. For the most part, each section and chapter is designed to be an entity unto itself and is meant to stand by itself without the support of other chapters or sections.

The information is presented in as nontechnical a manner as possible and is not meant to be hard reading. Line-drawn illustrations will be included from time to time to augment purely verbal descriptions and to assist the reader in obtaining a better grasp of the material being covered. While some of the included information is quite basic, all readers may make use of this approach in making an explanation to a court or jury that may not be technically inclined or technically oriented (or if so, along quite different lines).

The material covered in this text is of equal importance to investigators or technicians working in the criminal area and to those working with civil cases. In recent years, the use of scientific evidence and expert witnesses has become quite commonplace in criminal cases; yet, such evidence is not always used to its full extent in cases of a purely civil nature.

It has been said that a case is brought to court not for the purpose of obtaining justice but merely to obtain a legal decision. It only follows that the more facts presented before the court, the more likely it will be that the decision ultimately handed down will be a just one.

It is the responsibility of the attorney to present all available facts in support of his case, but it is the duty and responsibility of the investigator and laboratory examiner to furnish these facts. An eyewitness to an incident, for one reason or another, may be mistaken or fail to observe all that took place, and his testimony can only reflect what he believes the facts to be. Facts, as submitted by the expert witness, however, while they may be subject to interpretation, are concrete and may be substantiated by test or demonstration.

This book was written to assist the investigator or laboratory examiner in obtaining factual findings and in presenting these findings precisely. The attorney might profit by an understanding of the techniques used and the terminology used by both investigator and technician. Instances where the "experts" employed by one side in litigation present findings diametrically opposed to those of the experts of the opposing side are becoming much more rare than in the past. The findings of experts, regardless of who they may have been employed by, will normally be much the same. When an

attorney goes shopping for an "expert" who will submit findings favorable to his client, he is not looking for an expert—he is looking for an *opinion for hire*.

When biased testimony is presented, it often becomes evident to the court and jury that the testimony is biased, and this could well result in the loss of a case that otherwise had merit. It is often far better to attempt to explain away the facts than to hit them head-on and try to disprove them. If the veracity of an expert is truly questioned, opposing counsel should by all means attack the witness, but merely to attack an apparently truthful and knowledgeable witness in an effort to confuse him usually results in the court or jury becoming sympathetic to the witness. Should the facts show that a particular firearm was used in a shooting, it might be inferred that the owner of the weapon did the shooting. The identification of the weapon is *fact*. The identification of the shooter (based solely upon ownership of the weapon) is *inference*.

ORGANIZATION OF THIS BOOK

This book is broken down into four sections in an effort to keep closely related material together. It should thus be somewhat easier for the reader to locate needed information.

The first section deals with the laboratory examination of physical evidence and, to some extent, shows the capabilities and limitations of the laboratory examiner.

The second section provides background information on the use of certain instruments and gives methods and techniques that may be used by the investigator or technician.

Section three deals exclusively with methods of illegal entry and is designed to better prepare you in undertaking an investigation dealing with this subject.

The fourth section is a series of glossaries of terminology frequently needed by investigators or laboratory examiners to ensure that their reports and/or court testimony will be readily understood. This section will be of equal value to the attorney, for the same reason. Court reporters might also find these glossaries of value when converting their transcription of verbal testimony into written form.

ACKNOWLEDGMENTS

I wish to acknowledge the assistance and courtesy extended to me by a number of persons, firms, and organizations. Without their contributions, this book would be far less complete.

In particular, an acknowledgment is due Chief Warrant Officer James V. Vandiver, Headquarters, US Army CID Command, Falls Church, Virginia, for his assistance and for all the information he contributed in regard to casting and molding materials and techniques. Jim is an old friend and very knowledgeable in investigative procedures and techniques, particularly in the area of casting and molding. He has written numerous articles that have been published in the journals of a number of professional organizations, and he made most of this information available to me for my reference.

Special credit must also be given Mr. Burnett E. Dahl and Mr. Arthur Kenyon of Red Wing Shoe Company, Inc. The general office of this firm is in Red Wing, Minnesota. This firm is well known for the manufacture of quality work shoes. The information furnished by Mr. Dahl, a breakdown of shoe size distribution, permits an approach to the area of footprint examination that has hitherto been given little notice.

Mr. Philip L. Starrett of the L. S. Starrett Company, Athol, Massachusetts, maker of precision tools, very generously has permitted the use of both photographs and written material concerning the operation of micrometers. The L. S. Starrett Company has been in existence since 1880 and is known throughout the world for its precision tools and gauges. His contribution to this book is greatly appreciated.

Jensen Tools and Alloys, Jensen Tools, Incorporated, of Phoenix, Arizona, through the good offices of Mr. Henry T. Burgess, advertising manager, has very kindly permitted the reprinting of glossaries covering a number of tools from its catalog. These glossaries are very well written, and I could see no reason to attempt to improve upon them.

In addition to those persons and firms mentioned above, I owe acknowledgment to countless friends and contemporaries for bits and pieces of information gleaned over the years. Many of these people are no longer with us, others (like myself) are dinosaurs who are still "hanging in there," and still others are relatively new to the field. A great deal is owed to students and apprentices that I have been associated with over the years. It is surprising how much one learns from his students—they may not have the answers, but they sure have the questions, and in supplying answers the teacher learns.

One also learns from the layman. The attorney who poses questions that may not even be relevant to the case at hand will often, without knowing it, suggest a new approach to some specific problem. Then there are the mechanics and other craftsmen who are never too busy to explain matters in their own fields. To acknowledge the contributions of everyone whose thoughts and ideas appear on these pages, I would have to thank just about the entire population of this planet since the days of Adam (and then I'd miss somebody!).

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Section III: Methods of Entry

Section IV: Annotated Glossaries

A PRACTICAL GUIDE TO THE BASICS OF PHYSICAL EVIDENCE

Section I:
Laboratory Examination of Physical Evidence

Chapter 1

INTRODUCTION

In the investigation of crime, as well as the prosecution and defense of the accused, the examination and evaluation of *physical evidence* play an ever-increasing role. Physical evidence is also of importance in civil actions involving product liability and contests hinging on the authenticity of documents, the identification of persons or property, or the determination of negligent behavior or improper building practices. There are a virtually unlimited number of matters that can only be resolved as a result of scientific examination and evaluation.

In most texts, investigations and examinations in criminal matters are stressed; yet, physical evidence plays an equally important role in civil actions (as noted above). For the most part, civil actions are brought where there is no indication of criminal liability; however, civil cases often develop out of the investigation of an alleged criminal matter. A person may be civilly liable, criminally liable, or liable both civilly and criminally for his actions. In view of this, the work of the investigator or criminalist is not necessarily limited to the criminal area. While investigators or criminalists employed by law enforcement agencies are usually prohibited from becoming involved in cases of a strictly civil nature (because of possible conflicts of interest), they may well receive subpoenas to testify in a civil case if this case grew out of investigations or examinations that they performed because of a suspected criminal violation.

This text was not conceived to include detailed information on all types of physical evidence, investigations, examinations, and evaluations. This text was written for the specific purpose of filling a void that currently exists in books devoted to both the investigation and criminalistic fields.

Since the text does concern itself with physical evidence, and since it would be extremely difficult to limit any writing of this nature to firm boundaries (for in few investigations are the needed examinations confined to one area of expertise exclusively), the major capabilities and limitations

of the main areas of the criminalistics field shall be covered. There are a good number of books in current publication that cover in depth such areas as firearms investigation, fingerprint examination, questioned document examination, investigative and crime laboratory photography, crime scene investigation, forensic chemistry, and the like, and no one volume could hope to completely cover all of these fields. You (the reader), therefore, will be referred to other works for detailed information on many of these fields.

In this volume, the various areas of criminalistics are described in capsule form. No specific order of importance or relationship to other areas of expertise was considered in compiling this information.

Chapter 2

QUESTIONED DOCUMENT EXAMINATION

The work of the questioned document examiner concerns, but is not limited to, the comparison of handwriting, hand printing, typewriting, printed matter, and the like with known specimens to determine if both originated from the same source. He may also be called upon to authenticate and/or date documents and decipher obliterated, erased (including chemically erased), charred, or water-damaged writings. He also might be called upon to sequence a number of separate writings, determining if additions, interlineations, etc., have occurred or if pages have been substituted in multi-paged documents. He also compares watermarks and has knowledge of watermarks, typewriter type fonts, writing instruments, and much more.

In the comparison and identification of written, printed, or mechanically printed or reproduced material, the examiner relies upon *form identification*, as well as a number of other significant factors. This involves the shape, slant, size (as compared to other letters or numerals in the sequence), and relationship to the base line (location higher or lower than others in the sequence) of the letters; the manner in which *t*'s are crossed or *i*'s dotted; the presence or absence of serifs, lead-in strokes, completion strokes, pen (writing instrument) lifts; and a number of other factors, including *shading* caused by nib-type pen points (the widening or narrowing of a line caused by pressure on the pen or the direction of the stroke in relation to the angle at which the pen point is placed). This list could continue almost indefinitely, particularly if it included matters pertaining to typewriter ribbons, printing screens, or similar material or the idiosyncracies of an individual writer.

Handwriting or hand printing may vary considerably in writings by the same individual at widely spaced times of his life. Serious illness and/or drunkenness will also cause wide variations from the writer's normal writing style. All of the above must be taken into account by the examiner in his comparison and evaluation of a writing. Attempts to disguise handwriting by affecting a backstroke or change in the form of letters does not preclude

the making of an identification in all cases, as lead-in strokes, letter form, etc., will still be essentially the same, or, if they are different, the writer will usually lapse into his normal format somewhere in the writing. Even if the writer uses the opposite hand to write, letter form will be the same as that written by the normal writing hand, in most cases.

A person's writing will vary with conditions such as standing at a counter, sitting at a desk, being under stress, or being confined to a limited area on a piece of paper, and the investigator should take these conditions into consideration when obtaining exemplars from suspects.

Instruments and equipment used in this work include *macroscopic* and *low-power microscopic* equipment for viewing the material at slightly enlarged size, *stereomicroscope* equipment to permit viewing in three-dimensional form, *infrared* (IR) and *ultraViolet* (UV) viewing equipment for observing fluorescence or bringing up material hidden by erasure or masked by ink or some other material, special *micrometers* for determining the thickness of paper, as well as various other measuring devices, *glass plates* specifically scribed to enable the examiner to make slant and angle determinations, and *photographic equipment* to record documents or findings in either black and white or color.

Usually, the examiner will rely on a chemist to determine the chemical composition of inks, papers, and the like, with such examinations being done either by normal wet chemistry procedures or by instrumentation.

Specialized photographic techniques may be employed to show watermarks, infrared or ultraviolet reactions, indented writing (if a writing was executed on paper that had other sheets of paper beneath it, the writing may show as indented writing on these other sheets), or other items of importance that may not be shown clearly by normal photographic copying procedures.

Possible Determinations

Determinations that may be possible from the examination and comparison of documents include the following:

From the comparisons of paper

1. That the physical composition of the samples are identical or dissimilar
2. That the submitted paper samples were manufactured by the same firm (by watermark examination)
3. That the submitted paper samples were manufactured in the same time frame (by watermark examination, watermark design being changed periodically)
4. That one piece of paper was beneath the one upon which the writing was made (by comparing the original writing with the paper bearing

the indented writing—may be useful in suicide cases where a note is found or in cases involving threatening letters, where the indented writing may be found at the residence of the suspect)
5. That the original writing was altered in some manner (erasure, interdelineation, substitution of pages, etc.)
6. That similar stains are present on original and samples
7. That one piece of paper was torn from another piece (by matching the torn edges)
8. That submitted samples were cut by the same paper cutter or trimmer (by comparison of the cut edges)
9. That a piece of paper was removed from one specific tablet (from binding material that adheres to the paper, perforation placement, location of ruled lines, etc.)

From comparison of handwriting
1. That a writing was executed by one person or that more than one person was involved in the writing
2. That a writing was executed by a given individual (by comparison between original and exemplars)
3. That additions or deletions were made at a different time than the original writing
4. That a document is not genuine. (Examples might include anonymous letters, forged letters, bills, receipts, suicide notes, and checks)

From the comparison of typewritten material
1. That changes in the content were made by a typewriter other than the one typing the original material
2. That the typewriter used was manufactured at a date later than that on the document
3. That the document was typed on a machine used to type another document
4. That the typewriter used to type a document can be identified as the source of that document
5. That the typewriter can be identified as to make, model, and period of manufacture

By the examination of other marks or evidence
1. That a document is of a certain age (by examination of the watermarks, the state of preservation of the paper, the type of ink used, the deterioration of the ink, and the age of the typewriter used)
2. That a given check protector, numbering machine, rubber stamp, or seal was used to place a mark on the document

Care and Preservation of Document Evidence

When a document becomes a *questioned document*, it must be preserved, and a chain of custody maintained.

The following should be observed by the investigator in identifying and protecting document evidence:

1. Do not fold, bend, or crumple the document.
2. Do not carry the document in a pocket or place it in contact with anything that could mar, rub against, deface, or contaminate it.
3. Place the document between transparent protective covers. If document covers are not available, place between pages of thin typing paper.
4. If the document is marked for future identification, care must be taken to mark in such a place as not to cover any of the written or typed material or, if fingerprint work may be desired, to mark where no possibility of covering such evidence exists. Case number, date, and initials may be placed on the back of the document, and the exhibit number may be placed on either the back or front (not obscuring the written material). Particularly where fingerprint processing may be desired, it would be better not to mark the document but to preserve it (as previously noted) and place identifying markings on the envelope in which the document is enclosed, the envelope being sealed.
5. Make notes of all relevant information concerning the document: time, place, date, and from whom received, and manner of marking. Make additional notes concerning what happened to the document before it was received.
6. Should the document be torn, preserve it in its present state. Do not attempt to put pieces back together with cellophane tape or other material.
7. Protect the document from moisture and from those who might handle it and destroy fingerprints.
8. Protect it from exposure to strong light, which might cause deterioration of either paper or ink.
9. Keep the document in a secure place at all times.
10. Send charred documents to the laboratory for reconstruction and examination.

Obtaining Standards

When standards of handwriting, hand printing, typewriting, or other material must be compared to a questioned writing or document, the origin

of the standard must be proved. It serves very little purpose to establish that two writings were executed by the same person if it cannot be proved that one of those writings was that of the suspect. The origin must be proved before a specimen can be accepted as a standard. The principal methods of establishing the origin of a writing are by requesting the suspect to execute a duplicate of the questioned document to be used for comparison purposes, by obtaining the testimony of a person who saw the writing executed, and by having the writer acknowledge the specimen as being his own writing.

In obtaining known standards of handwriting or hand printing from a suspect, samples of writing should be taken with the subject standing, sitting, and using the opposite hand (if there is any indication that the writing may have been executed with the opposite hand).

The writing instrument used to make the known standard should be similar to the instrument used to execute the questioned writing. If the questioned writing is done with a fountain pen or other ink pen, for example, the standards should not be made in pencil, ball-point pen, or crayon.

The paper on which the standard is written should be the same type as the questioned document; it should be the same size, and if there are lines or printed material that restrict the size and placement of the writing, this too should be duplicated. The material to be written should be dictated to the subject, with only one specimen of writing per page. If the questioned writing is hand printing, such as "This is a holdup! Put all large bills in this bag," it is especially important not to have the subject execute this material five or six times on the same sheet of paper. Moreover, if the subject is attempting to disguise his normal writing, it is much easier for him if he can merely copy what he has already written.

Should the suspect ask how to spell a word, do not spell it for him—allow him to make whatever mistakes in spelling, grammar, letter form, or anything else that he would normally. Sometimes, incorrect spelling may be a clue to the identity of the writer.

In summary, then, procedures to be followed in obtaining standard writings include the following:

1. Provide the suspect with paper similar to the paper bearing the questioned writing.
2. Provide a writing instrument similar to that used to execute the questioned writing.
3. Require the suspect to write exemplars under conditions similar to those under which the questioned document was written, i.e. if it is known that the writer was standing when the questioned writing was made, as with the writing of a check at a checkout counter, have the suspect stand while making the exemplars.

4. Require the suspect to use the same type of script as used in the questioned document. Longhand script cannot be compared to hand-printed matter, for example, and if all letters in the questioned writing are capitalized, the suspect should not be allowed to use lowercase letters in the exemplar.
5. Use only one side of a piece of paper for the taking of an exemplar, unless the exemplar is of a check bearing an endorsement on the reverse side.
6. Dictate the substance of the document to the suspect. Do not allow him to copy from a "ready-written" sample.
7. Collect an adequate number of samples. If a writing is limited to a few words, such as the signature on a check, fifteen to twenty samples are needed. If the writing is longer (a letter or note of some length), fewer samples will be required.
8. Obtain a statement from the subject that the samples were made freely and voluntarily, preferably a document in his own handwriting and not merely a typed statement that he must sign.
9. Obtain other known writings (job applications, driver's license examinations, cancelled checks, etc.) of the suspect, if possible.
10. Identify each exemplar on the reverse side with case number, date, time and place taken, whether the right or left hand was used (and whether this is the normal hand of the writer), and any other information that may be pertinent.
11. Avoid excessively obscene material in the taking of standard writings, unless the material to be written is quite short in length. If identity can be established from the remainder of the writing, no claim that the nature of the writing is prejudicial to the case in court can then be made.

Typewritten Standards

Where a questioned document is typewritten and an attempt is being made to locate the specific typewriter used to execute the material, exemplars should be obtained as follows:

1. The questioned document should be copied exactly. If the document is lengthy, only a paragraph or so need be copied, preferably at the beginning. The same type of paper should be used, and fifteen or twenty specimens should be made.
2. Each letter and character on the machine should be reproduced by typing the entire keyboard with the machine in both the shift position and the normal lowercase position.

3. On each sheet used to type standards, the following should also be typed (using the machine in question):
   a. Name of person making the standard
   b. Name of the manufacturer of the machine
   c. Serial number of the machine and model number (if known)
   d. Date the standard was made
   e. Place the standard was made

   The initials and the case number should be handwritten on the reverse side of the typewritten exemplar.

Additional to the above, a carbon stencil might be obtained. This can be accomplished by removing the typewriter ribbon, placing a sheet of carbon paper over the paper on which the standard is to be made, and typing directly onto the carbon. Carbon stencils are much more clear than typing made with a ribbon, and small imperfections will show clearly.

Conclusion

While the foregoing should cover much of the material needed in the investigation of questioned document matters, questions are bound to rise. Whenever there is any question concerning the method of obtaining exemplars, the number needed, the packaging and preservation methods, or a like matter, the questioned document examiner should be contacted by telephone and the question posed directly to him.

Each examiner of questioned documents will have preferences as to how exemplars are to be obtained, how many are needed in given cases, etc. Get to know the examiner and his requirements. The more closely you follow his instructions in obtaining exemplars and other material, the better the chances of getting the best results with fewer requests for you to obtain additional standards or do other repeat work.

When a case is submitted to the laboratory or to the questioned document examiner, it should be submitted along with necessary chain of custody forms and as complete a synopsis of the case under investigation as possible. The synopsis, which may show what investigation to date has developed, is needed by the examiner not to bolster his findings but merely to indicate what may be proved by the evidence submitted to him. Often, the examiner is in a better position to evaluate what examinations might be performed after reading the synopsis.

Chapter 3

FINGERPRINT EXAMINATION

The work that is performed by, or within the capabilities of, the fingerprint examiner may include, but is not limited to, the classification, search, and filing of inked and rolled fingerprint impressions; the taking (recording) of inked fingerprint impressions, from either a living person or a dead body, including a burned or decomposed body (postmortem impression); the processing of evidence either at the scene of a crime or incident or in the laboratory for the development of latent finger/palm impressions (to include impressions made by the soles of the feet and/or the toes); the evaluating of developed latent impressions to eliminate those lacking sufficient identifying characteristics from which identification might be made; the comparison of two or more fingerprints to ascertain if both or all were made by the same person; the preparation of fingerprint charts for court purposes (used in demonstrating identity between record and evidence prints).

The equipment needed (or used) by the fingerprint examiner is not extensive; a good quality *fingerprint magnifier* and some sort of pointer are all that is really needed for comparison work. (Usually, two magnifiers and two pointers are used—one magnifier and pointer for the record impression and the same for the developed latent—so that the examiner need not continually be shifting the magnifier back and forth from one to the other.) The fingerprint examiner will also need *fingerprint brushes, fingerprint powders, lifting tape, scissors, tweezers, gloves, certain chemicals* needed to prepare the solutions for the chemical development of latent impressions, and such other equipment as he may prefer. Every examiner or crime scene technician who processes for the development of latent fingerprint impressions has his own personal preferences when it comes to the equipment he feels that he needs to process evidence.

Additional duties of the fingerprint examiner might include photography, crime scene search (crime scene investigation), footprint and tire track examination, and/or such other work as he may be qualified to perform.

From the above, it might be concluded that the fingerprint examiner is not involved in a very complex specialty; however, this is certainly *not* the case. Further, the work can be very disagreeable at times, as anyone who has had to obtain fingerprints from a badly decomposed body can attest.

Latent Fingerprint Development

The inner surfaces of the fingers, palms of the hands, soles of the feet, and under portions of the toes all possess friction ridges. These ridges, placed there by nature, increase our ability to grip things, being essentially a sort of nonslip or nonskid surface. The outermost surfaces of these ridges contain pores that emit the fingerprint secretion. This secretion consists primarily of water, plus salts, amino acids, starches, and other substances. When any of these surfaces come into contact with another surface, an impression is left, much like when a rubber stamp is impressed on a piece of paper. These impressions, however, are essentially invisible until developed either chemically or by use of fingerprint powders.

Basic Dusting Procedure

On occasion, fingerprints may be located on a surface by shining a light from a flashlight at an oblique angle over the area where such impressions may exist. Another method is to cover the entire surface with a light coating of fingerprint powder, which makes the impressions visible (as the powder adheres to the deposited secretion from the fingers).

Once the latents have been located, processing with fingerprint powder is the most common and effective method of developing the impressions so that they may be photographed or lifted for future use. The following is the basic procedure for developing and collecting latents by use of powders:

1. The brush should be clean, and the bristles or fibers loosened. New Fiberglass® brushes need to be thoroughly loosened prior to their first use, as the fibers tend to adhere to each other. To loosen, roll the handle of the brush between the palms of your hands and rotate the brush briskly.
2. It is advisable to pour a portion of the fingerprint powder into the lid of its container and then dip the tip of the brush into this powder and gently tap the brush handle to remove the excess. This method is preferable as less possibility exists of inadvertantly spilling powder should a slip cause the container to be overturned.
3. Sweep the brush gently across the surface to be processed, while watching for development of the fingerprint ridges. Once the prints