FEDERAL LAW ENFORCEMENT TRAINING CENTER

POLICE TRAINING DIVISION

INVESTIGATIVE PHOTOGRAPHY

TEXT

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PART II

INVESTIGATIVE PHOTOGRAPHY

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PREFACE

Some investigative agencies have full time specialists who can perform the necessary photographic work. Even when full time specialists are not available most agencies can still call on men who can perform difficult photographic assignments because they have a personal interest or advanced training and experience. Generally, however, such assistance is not available for routine investigations and the agent who is conducting such an investigation must do the photography himself if it is to be done at all.

This text is intended as a guide for the new investigator who may encounter a real need for making photographic records when assistance is not available. Although the text includes references to other types of cameras, all of the work described can be done with a good 35mm camera together with the accessories commercially available for it. With the exception perhaps of the more difficult kind of evidence photography which must be done in a laboratory, every journeyman investigator should be able to do the work described in this text when it becomes necessary in the conduct of his investigations.

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PART II

CHAPTER 1

MUG SHOT PHOTOGRAPHY

11. CAMERA AND FILM

In many cases, a federal investigator can process his prisoners through the U.S. Marshals' office, or through a local police department. These agencies as a rule will provide him with copies of the mug shots they obtain as a matter of normal booking routine. Frequently, however, the investigator will want to process his own prisoners. When such is the case, a 35mm camera with normal lens and color negative film, such as Kodacolor-X, are recommended. The advantages of using color negative film are:

(1) Normal color prints and enlargements can be ordered simultaneously in the quantity needed. One-day commercial processing service is available in most large communities.

(2) Color slides and black-and-white prints can be made from the color negative, if they are required.

When mug shots are needed immediately, or if commercial processing is not available, or not advisable for security reasons, a polaroid camera and color film are recommended. The advantages of polaroid are:

(1) The pictures are available within seconds. Poor quality shots can be discarded and better ones obtained on the spot.

(2) Security in sensitive cases is maintained.

12. TAKE HEAD-AND-SHOULDER SHOTS

An identification photograph must serve to identify the subject beyond any reasonable doubt. The investigator is not concerned with producing a flattering picture; on the contrary, he must reproduce every freckle, mole, scar, and blemish which might aid in identifying the subject. Close-ups of head and shoulders, both front and profile views, with a generally flat front lighting will accomplish this. Take full-length shots only if there is a special requirement for them. As a rule, full-length shots are not as useful as head-and-shoulder shots.

13. USE FLAT FRONT LIGHTING

Good mug shots can be made with available indoor lighting. However, the soft lighting provided by No. 1 photoflood lamps with diffusers will be more satisfactory for this work. The lamps should be placed close enough to the subject to permit the use of a fast shutter speed, but not so close as to be uncomfortable for the subject because of heat and glare. Electronic flash is also good for mug shots because

its very short exposure time eliminates the problem of subject and camera movement. Select an aperture that will give sufficient depth of field and position the flash at the distance for correct exposure at that lens opening.

14. WATCH OUT FOR REFLECTION FROM GLASSES

Since glasses are difficult to photograph without reflections obscuring detail around the eyes, it is suggested that a collection of different kinds of eyeglass frames without lenses be kept on hand for the subject to wear in place of his regular glasses. If these are not available, take extra shots, both with, and without glasses, or use a polarizing filter.

15. SHOOT FROM SUBJECT'S EYE LEVEL

To get the best perspective when taking mug shots (front and profile views), the camera lens should be at the subject's eye level. All mug shots should be taken at the same camera-to-subject distance chosen to suit the size of negative and the focal length of the lens so that the subject fills the picture area. Similarly, full-length shots, if required, should be taken from a fixed distance (greater, of course, than that used for the bust-type photographs) so the figure fills the frame. The camera lens should be at the subject's chest level to get the best perspective for full-length shots.

16. USE AN IDENTIFICATION BOARD AND HEIGHT SCALE

If a standard identification board is not available, prepare a large card for the subject to hold while his picture is being taken. This should include, in large legible letters, the subject's full name, date of birth, the date the picture was taken, and the case, or arrest number. A height scale should be included in the shot, or the subject's height indicated on the identification board. If a height scale is used, it must be adjusted for parallax (the difference between the camera angle and true horizontal) to reflect the subject's correct height.

17. SHOOT AGAINST A NEUTRAL BACKGROUND

Have the subject stand far enough away from the wall so that any shadows cast by the lighting arrangements will not appear in the picture. The background should be as neutral as possible. Pictures, calendars, fixtures, or other objects should not appear in the field of view.

CHAPTER 2

SURVEILLANCE PHOTOGRAPHY

21. THE CHALLENGE

Surveillance is the process of keeping persons and places under observation to develop information concerning their activities and identities. Most surveillances must be conducted without the knowledge of the subject, and the subject often goes to great lengths to hide his activities. Surveillance work therefore presents one of the most challenging assignments to the law enforcement officer. Similarly, using a camera under surveillance conditions presents a challenge to the photographic skills of the investigator. A particular surveillance may have to be conducted on foot, by vehicle, by boat, from the air, from fixed posts of observation, or by a combination of any of these means, and it may have to be conducted by night as well as by day, in metropolitan areas or in the country. The particular circumstances of a given surveillance will dictate whether photographs should be obtained, but requirements are so varied that fixed instructions cannot be set down. In some cases, arrangements must be made within seconds, whereas in other cases the investigator can select his vantage point and plan his concealment well in advance. The necessity to obtain pictures often entails an added risk of exposure or considerable additional effort and ingenuity to find a secure place from which the pictures can be taken.

22. THREE GENERAL RULES

When the decision is made to obtain photographs during a surveillance (this may be the primary purpose), the assignment should be planned in the light of three general rules:

22.1 Rule 1. Provide for Solid Camera Support

This rule cannot be over-emphasized. Solid camera support is of the utmost importance when shooting with long focal-length lenses. Lack of sharpness in pictures is almost always due to camera movement, rarely to the lens itself being out of focus. Solid Camera support can be difficult to achieve under surveillance conditions but it is nevertheless essential.

22.2 Rule 2. Shoot from Subject's Eye-level

People generally see and identify each other from eye-level. They do not often see each other from above or at odd angles and consequently cannot always make identifications from these angles. Also, subjects have a disconcerting tendency to look down when walking, and invariably do so when leaving a building if there are steps to negotiate. Pictures taken from above at such moments will not show facial characteristics.

22.3 Rule 3. Get as Close to the Subject as Possible

Generally, satisfactory pictures for subject identification cannot be obtained with a normal lens (50mm) at distances greater than 50 feet. Under ideal conditions (plenty of light, solid camera support) it is possible to obtain acceptable identification shots with a normal lens up to 100 feet, but that is the practical limit. Beyond that distance the image of the subject on the negative will be too small for effective enlargement.

23. USE OF TELEPHOTO LENSES

23.1 The Camera-to-subject/Focal-length Rule

When it becomes necessary to photograph from distances greater than 50 feet, longer focal-length (telephoto) lenses must be used. The rule for identification pictures is one millimeter of focal length for each foot of camera-to-subject distance:

Camera-to-subject distance (in feet)	Minimum Focal Length (in millimeters) for Identification Photos
50	50
100	100
200	200
500	500
1000	1000

Ideally, a telephoto lens with focal length sufficient to bring the subject close enough in to fill the negatives should be used. In practice, however, it may not be wise to use a focal-length greater than three times the camera-to-subject distance even though the subject's image will not fill the negative at this ratio. The effective aperture of normal telephoto lenses decreases as the focal length increases. Small apertures require the use of slower shutter speeds to obtain correct exposure, and slower shutter speeds increase the danger of fuzziness due to camera movement. Also, with normal telephoto lenses, the greater the focal length the greater the effect of camera movement regardless of shutter speed. When lighting conditions are bright and camera support is absolutely firm, telephoto lenses that fill the frame with the image of the subject can be used effectively.

23.2 Mirror Lenses

The undesirable magnification of the effects of camera movement encountered in the use of a normal telephoto lens can be overcome by using a catadioptric or mirror lens. Such a lens is physically much shorter than a telephoto lens of equivalent focal-length and thus there is much less magnification of camera movement. These lenses, however, are constructed in such a way that they can operate at only one fixed aperture. When a trade-off must be made between aperture and shutter speed while using a catadioptric lens, only the shutter speed can be varied. The use of such a lens is therefore limited to ideal lighting conditions.

24. MOVIE CAMERAS

When the purpose of a surveillance is to record illegal activities rather than obtaining identification pictures, the 16mm motion picture camera is the preferred means. No other medium can record action as well at a comparable cost. Although 16mm motion picture cameras are usually larger and heavier than 35mm still cameras, they are still small and light enough to be easily portable. Film is available in magazines for rapid reloading and such cameras usually have single-frame operation so that pictures can be taken sequentially at any desired interval. Also, when a large number of frames are taken of a given activity, individual frames can usually be found which are suitable for enlargement to enable positive identification of the subjects involved.

25. SUBMINIATURE CAMERAS

Contrary to popular notion, subminiature cameras have limited usefulness in surveillance work. The concept is good, but in practice the conditions under which subminiature negatives are obtained generally preclude acceptable results. Enlargements are almost always of poor quality. When the use of a subminiature camera is necessary, one with a 16mm format should be used in preference to one with an 8mm format.

26. SURVEILLANCE FILM

Since photography under surveillance conditions must usually be accomplished with available light, high-speed films are essential. For a discussion of an excellent high-speed film, see Section 45.2 in Part 1 of this text.

27. RAID SCENE PHOTOGRAPHY

27.1 The Objective

Raid scene photography fills the gap between surveillance photography and crime scene photography. Surveillance photography is done primarily to obtain intelligence, to record criminal activity and establish the identity of persons involved in that activity. Crime scene photography is accomplished after an offense has been committed primarily to record physical evidence, often before suspects are arrested or even known. Raid scene photography provides photographic record of enforcement activity rather than criminal activity, and of arrest action and search procedure rather than evidence. Whenever a raid or search is planned which may involve forced entry, damage to property, the arrest of suspects, or the control and detention of persons at the scene, provision should be made to photograph as much of the action as possible. Usually there is a considerable amount of confusion during a raid with many things going on at one time. A sequence of pictures aids tremendously in re-creating the progression of events and the roles played by the various investigators during this period. Also, experience indicates that the presence of a photographer at such times has a sobering effect on all concerned. For example, persons otherwise disposed to resist or incite trouble are more circumspect when they know their actions will be photographed by an officer. Later, if the issues are raised, the pictures serve to refute claims of brutality and excessive use of force, or to justify the force used based on the behavior of those resisting or causing trouble. The objective of the raid scene photographer therefore is threefold:

1. To obtain identification quality photographs of all persons present, particularly those who may not subsequently be arrested but who may be called as witnesses.

2. To obtain a photographic record of the full extent of damage to the premises if entry was forced or violence occurred.

3. To obtain a photographic record of the nature and extent of apparent injuries sustained by anyone present during the period, and the appearance and physical condition of persons who mainfest illness, intoxication, drug use, or other abnormal behavior.

27.2 Equipment

Raid scene photography is best done with a fully automatic, cartridge-loading camera that has a spring-loaded or motor driven shutter. Pictures can be taken with such a camera in very rapid succession. The photographer has only to focus the lens and press the shutter release to take a picture. Lens setting is made and shutter

cocking is done automatically. Film reloading is accomplished in less time than it takes to tell about it. Flash cubes (four bulbs to a cube) or fast re-cycling electronic flash permit pictures to be taken in rapid succession even in low light situations. Color negative film should be used. A wide angled lens is probably better for indoor raid scenes because it has a wider view and greater depth of field than a normal lens. Since raid scene shots must usually be taken in rapid succession, no attempt should be made to use a tripod. But, hold the camera steady.

CHAPTER 3

CRIME SCENE PHOTOGRAPHY

31. THE PURPOSE OF CRIME SCENE PHOTOGRAPHY

The rules and procedures of crime scene photography are discussed below primarily in terms of the requirements for assault and burglary type cases because the solution of such cases often depends entirely on the discovery and preservation of physical evidence requiring the use of photography. However, the rules and procedures apply to all types of cases where physical evidence may be of importance. Although federal investigators as a rule will not be handling murder, rape, and burglary cases, they will be concerned with physical evidence at still sites, counterfeiting plants, custom bonded warehouses, bookie joints, and offices wherein frauds or conspiracies are committed against the United States.

The depth and scope of the photography done at a crime scene will depend on the importance of the physical evidence to a successful prosecution of the particular case rather than on the type of crime. Whatever the offense, when physical evidence is involved, the rules and procedures discussed below will apply.

32. PHOTOGRAPH EVERYTHING BEFORE IT IS MOVED

In certain types of crime, particularly those involving physical violence, the crime scene, including the location of relevant objects within it, is of vital importance in establishing elements of the offense. A permanent record of the crime scene in such cases is often indispensable to a successful presentation of the case in court. If the scene is altered through carelessness or haste, it can never be restored to its exact original condition and vital elements of proof may thereby be lost. Moreover, in the initial stages of an investigation, the significance of certain aspects of the scene may not be evident, although later they may vitally affect the issues in the case. Hence, the first step in the investigation of such a crime is to photograph completely and accurately all aspects of the scene before potential physical evidence is removed or otherwise disturbed. It is always wise to make too many photographs rather than too few.

33. GENERAL PROCEDURE

33.1 Shoot the Over-all Scene First.

When photographing a crime scene, the aim should be to record a maximum of useful information in a series of pictures which will enable the viewer to understand where and how the crime was committed. The

term "crime scene" refers not only to the immediate locality in which the crime took place, but also to adjacent areas where important acts may have occurred before or after the commission of the crime.

32.2 Take Medium Shots Next.

Photographs of the broad area of the locale of the crime scene should be supplemented by closer shots of sections containing important detail. Each object or area should be photographed so that it can be easily located in the over-all pictures, thus enabling the viewer to gain a clear concept of its position with reference to other objects at the scene.

33.3 Take Close-up Shots Last.

"Close-up" in this context means about 18 or 20 inches from the subject matter, or as close as the normal lens (50mm) will focus. All small items of known value as evidence should be photographed at this range at the scene. If close-focusing lenses, close-up attachments, or bellows extensions are available at the scene, some of the evidence photography can be accomplished there, but the evidence should also be taken to the lab for additional close-up work. Evidence photography, as distinguished from crime-scene photography, is covered in Chapter 4.

34. LIGHTING PROBLEMS

The existing light at a crime scene is rarely satisfactory for photographic purposes. Therefore, plan to provide additional illumination. Photoflood, flashbulbs, or electronic flash can be used. Remember, the illumination from a light source decreases rapidly as the distance away from it increases. For example, at 10 feet from a flash, the illumination is only ¼ as intense as at 5 feet. This can cause difficulties when you must photograph a large room or, particularly, a long hallway or two or more connecting rooms, because the objects close to the flash will be over-exposed while those at the far side of the room will be underexposed.

The answer is to use two or more light sources placed to give more uniform illumination to the different parts of the scene. If you don't have extra extension lamps, you can accomplish the same thing by making several exposures on the same piece of film, changing the lamp's position between exposures. (The camera, of course, must be on a rigid tripod so that it cannot move between exposures and blur the image.) This technique is called "painting-with-light".

35. PAINTING WITH LIGHT

If you must photograph a series of two or more connecting rooms, mount the camera on a rigid tripod and focus on a point one-third of the way into the depth of field. Close the lens down to an opening which will provide sufficient depth of field to include everything to be photographed in sharp focus. As an example, assume this turns out to be f/16, and your flash guide number is 160. Then divide 160 by 16 to determine the lamp-to-subject distance. In this case it would be 10 feet. With the shutter open on time, fire one flash bulb toward the subject from the camera position; and then have an assistant cover the lens with a lens cap or film slide. (It is better to carefully cover the lens; repeated opening and closing the shutter may move the camera slightly and thus produce multiple images.) Then take the flash gun about 10 feet from the camera, signal your assistant to uncover the lens, and fire another flash bulb, after which the assistant again covers the lens. Repeat this procedure using as many flash bulbs 10 feet apart as necessary to light the area of interest. Always try to stand where the camera will not photograph you, and be sure to point the flash away from the camera. A similar procedure can be used for photographing an auditorium or an outdoor scene at night. At signals from the investigator, the assistant uncovers the lens or opens the shutter; and the investigator sets off the flash at strategic points to provide fill-in light for the more distant areas. Sometimes as many as 12 or 15 separate flashes may be required to illuminate an extensive area such as an accident scene along the road. A detailed treatment of flash techniques is given in the Kodak Data Book, "Flash Pictures."

36. OBTAIN A FAIR AND ACCURATE REPRESENTATION

36.1 Plan Each Shot to Appear Natural.

When photographs are offered in evidence by the prosecution, the defense attorney will often attempt to discredit them by showing that they are not a fair and accurate representation of the scene or subject matter. This is particularly true in trials involving crimes of violence and automobile accidents. The investigator should keep this foremost in mind and plan his photographs to appear natural to the eye. The size and spacing of objects in the pictures should convey the same impression the viewer would have seen had he been at the scene of the crime and placed his eye where the camera lens was when the photograph was taken.

36.2 Shoot From Eye Level.

For a general view of the scene, the camera lens should be located and directed just as the eyewitness would be observing the scene from a standing position. There are, of course, exceptions to this simplified rule. But, if the purpose of the photograph is to provide a fair and accurate representation of the scene as the average eyewitness might have observed it, this rule will prevail. Naturally, if you wish to show

an object out of the normal line of vision, the camera must be placed elsewhere. Other camera positions should then be used to give any additional views that will be helpful to an understanding of the scene.

36.3 Show Relationships, Not Measurements.

Crime-scene photographs are usually intended to help the jury in understanding the testimony concerning the layout of the scene, not to be a blueprint from which the exact dimensions can be determined. If dimensions are important, they should be obtained and recorded independently, except as described in the next section.

37. MARKINGS IN THE FIELD OF VIEW

37.1 Purpose of Markings.

Because some judges object to rulers and marking devices in a photograph of a crime scene, it is wise to take pictures first without, and then with the rulers or markers. The purpose of markers is to assist in understanding such matters as relative size and location of objects, or directions of movement. Markings must never conceal any significant part of the view.

37.2 Measuring Devices.

Measuring devices such rulers, yardsticks, and tape measures may be used to show relative size and distances between objects. They should be placed beside the object in such a manner that they will not obscure any important part of the evidence. In photographing a looted safe, for example, a 6-foot ruler placed beside it will give the viewer of the final print a correct idea of the size of the safe. In document and small-object photographs, a 6-inch ruler placed at the bottom or just below the evidence will show its relative size.

37.3 Showing Directions of Movement.

Markers in the scene to show direction of movement will often help explain matters to a jury. One technique for vividly showing the path of a bullet, for example, is to stretch a white cord from the point of impact to the apparent point of discharge of the weapon. The scene should be photographed both with and without the cord. Marks made by bullets on impact with a wall or other solid object should be photographed from the assumed point of fire, as well as close-up. If the position of the person firing the weapon is unknown and difficult to determine, photographs should also be taken from the point of impact back along all the possible directions of fire.

38. PROCEDURE IN ASSAULT TYPE CASES

38.1 The Objective.

A major purpose of the investigator in assault type cases is to record signs of any struggle at the scene where the attack occurred, either indoors or outdoors, or indications of the victim's efforts to resist attack, such as bruises, black-and-blue marks, torn clothing, or any other evidence that might link the presence of either or both parties to the scene where the attack took place.

38.2 The Scene of the Crime.

The locale itself may be important to show that outcries of the victim could not be heard or to illustrate the fact that the nature of the place would make it an unlikely meeting ground for ordinary social purposes. Thus, photographs to show the remoteness of the scene from general traffic or from the nearest dwelling may be useful. (Aerial photographs often show such areas best.) A close-up view of the scene should be made to show the area where the crime took place. Additional shots should be made of special features, such as foot and tire impressions; broken branches; buttons; torn clothing or other personal property; used matches and booklets of matches; distribution of rocks, foliage, and other natural features; and the displacement of objects from their normal position.

38.3 The Suspect.

It is important to photograph all potential evidence which may link the suspect to the scene of the crime. This includes the suspect, his clothing, his means of transportation, and tools or weapons he may have in his possession.

38.4 The Victim.

Evidence of resistance to the criminal act is particularly important. Bruise marks and discolorations on the victim's body should be **photographed.** (color film is essential for this). The condition of specifically affected parts of the body, and the area of the body where foreign hairs, fibers, or biological stains are found should be photographed. Traces associating the victim with the crime scene are also important in some cases to confirm the victim's account of the occurrence.

39. PROCEDURE IN BURGLARY TYPE CASES

Each burglary type crime will have individual features which should be photographed. Photograph all evidence that may tie the criminal to the scene and try to show clearly those features which aid in establishing the elements of the offense. The following recommendations apply to all crimes that involve breaking and entering:

(1) General views of the exterior of the building.
(2) Point of break or entry. These should be photographed in such a manner that the marks of force will show clearly.
(3) Point of exit.
(4) Condition of rooms.
(5) Articles left at the scene, such as burglar's tools.
(6) Trace evidence, such as burned matches and cigarette butts.
(7) Tool marks and impressions of shoes or tires.
(8) Fingerprints and shoeprints as well as articles on which these may be found.
(9) Areas or objects from which articles were removed, such as wall safes, desks, file cabinets, and cash registers.

CHAPTER 4

EVIDENCE PHOTOGRAPHY

41. THE ROLE OF THE INVESTIGATOR

As a rule, field investigators will not be called upon to do evidence photography. The time element is usually not critical after the crime scene work has been done. Once the evidence has been removed, preserved, packaged, and transported to a laboratory, further processing can usually be put off until the services of a fully qualified criminalist are available. The analysis, the evaluation, and the necessary photography of evidence should be done whenever possible by an experienced criminalist. Indeed, much of it can be done only by an expert. However, there is a critical shortage of criminalists and the field investigator may have to do some of the less complex work himself simply because no one else is available, or has the time to do it. A good deal of evidence photography involves the straight forward application of simple rules and procedures well within the capabilities of a journeyman investigator.

42. PHOTOGRAPH IN THE LABORATORY IF POSSIBLE

After the crime scene photography has been accomplished as described in Chapter 3, portable items of evidence requiring further processing should be taken to a laboratory where they can be photographed under the most favorable conditions.

"Close-up" in connection with evidence photography means as close as necessary to record the traces, marks, or striations that constitute evidence. The range is from about twenty inches down to a few millimeters or less, depending on the nature of the evidence.

43. CHAIN OF CUSTODY

It is very important for the investigator to label in the prescribed manner every item of evidence he removes from a crime scene, not only to prevent a possible mix-up of evidence but to insure that it will be useful as evidence in court. All small items should be placed in containers and the containers labeled with the case number. If he releases custody of the evidence, the investigator should obtain a signed receipt containing a description of all items passed on by him to a laboratory, or evidence custodian so that the continuity of handling can be preserved. The investigator should also observe and record some peculiar characteristic of the evidence so that he can positively identify it later as the material he found at the scene.

44. PHOTOGRAPH ITEMS INDIVIDUALLY

Important items of evidence, such as tools, weapons, contraband, and items which may deteriorate or change with time should be photographed individually. Some objects may require more than one photograph in order to show the trace evidence on all surfaces. This provides a permanent record of the original appearance of the object, provides a supplement for the case report, and protects the valuable evidence from unnecessary handling. A ruler or scale should be placed slightly below the evidence to indicate its dimensions in all close-up photographs.

45. SHOE AND TIRE IMPRESSIONS

Imprints of shoes and tires are often found at a crime scene. Although they may later be reproduced by plaster casting, they should be photographed first. Place the camera on a tripod with the film plane parallel to the ground. In the case of footprints, include a ruler beside the print and adjust the camera to obtain as large an image as possible. In case of tire prints, select a length of track for best tread pattern, especially areas which reveal defects, such as cuts, which may help to identify an individual tire. Photograph the impression in several sections of sufficient length to correspond to the entire circumference of each wheel.

46. DUSTY SHOE PRINTS

Occasionally dusty shoe prints are found on a newly waxed floor or on paper strewn on the floor. These may be visible to the eye but difficult to photograph because of poor contrast, color, printing (such as newsprint), or the pattern on the linoleum. Sometimes the dusty shoe print can be lifted by using a material such as Lift Print and then photographed. Lift Print is a flexible black rubber matrix material with a tacky surface. When the matrix is laid down on the print and rolled lightly with a roller, the dust that forms the footprint adheres to the matrix and stands out in good contrast against the black background of the matrix. When a suspect is found, his actual shoe or dusty print made from it should be photographed in the same manner. If the two negatives, the one of the original dusty print and the one of the suspect's shoe print, are identical in size, it should be possible to superimpose the two negatives, or positives made from them, to show that the two match.

47. PHOTOMACROGRAPHY

Photomacrography, in general, is the photography of objects which are too small for the conventional camera and too large for the field of a microscope. Very short focal-length lenses and long bellows extensions are used. Details on the technique are contained in the Kodak Pamphlet No. P-53, Photomacrography.

48. PHOTOMICROGRAPHY

Photomicrography is photography through a microscope. This is a highly specialized technique which is covered in the Kodak Data Book No. P-2, Photography Through the Microscope.

CHAPTER 5

FINGERPRINT PHOTOGRAPHY

51. INTRODUCTION

The following discussion presumes that latent prints have been photographed at the scene to establish their location and relationship with other objects for purposes of orientation. The next step is to record the latents in maximum detail for identification purposes. This should be done in the laboratory except where it is impractical or impossible to transfer the latent-bearing object from the crime scene. The procedures described below are applicable to palm prints, footprints, shoeprints, heel impressions, glove impressions, and similar marks and patterns as well as to latent fingerprints.

52. THE BIG QUESTION: TO LIFT FIRST OR TO PHOTOGRAPH FIRST

Although it is generally much easier to photograph the lift of a latent fingerprint than the latent itself, ideally, every latent should be photographed before lifting. Some authorities insist that this be done. Mr. Lowell W. Bradford, Director, Laboratory of Criminalistics, Santa Clara County, California, who heads what has been described as the best criminalistics operation in the nation, is perhaps the foremost proponent of the rule to photograph first. The military and the FBI follow this rule, and lift first only when the print is so located that it is impossible to obtain a satisfactory picture otherwise. In practice, however, a problem arises from the fact that fingerprint photography can be very difficult and technicians with the ability and equipment to do the difficult jobs are not always available. The investigator must then either arrange for the latent-bearing object to be transmitted to a laboratory for processing, or lift the print first and do the photography later. If the investigator decides to send the latent-bearing object to the laboratory, he runs the added real risk of loss or damage to the latent during transmittal. The investigator must make a decision in terms of the importance of the case, the availability of technical assistance, and the level of his own technical competence. Because of the severe shortage of technicians in the field today, it often happens that unless the investigator does the job himself, it never gets done. It is always preferable to lift first and do the photography later than to do nothing because a technician is not immediately available.

53. EQUIPMENT AND MATERIALS

53.1 Cameras.

The 35mm camera can be used successfully for latent fingerprint photography. Bellows extensions and other necessary accessories are available for practically all makes of 35mm cameras. However, because of the larger format, better results can usually be achieved with a 4 x 5 all-purpose camera such as a Speed Graphic. Most technicians prefer a 4 x 5, and if one is available, it should be used. The discussion below assumes the availability of a 4 x 5 camera, but the principles of operation are the same for a 35mm camera with a bellows extension, except that focusing cannot be done on a ground glass at the film plane.

53.2 Films.

Well-defined fingerprints can be photographed with any film. However, weak prints which may be destroyed by dusting require all the contrast possible. For weak prints, an ortho film such as Kodalith is recommended.

53.3 Filters.

Color filters provide some control of contrast when prints are found on colored surfaces or when colored dusting powders are used. However, use filters only when they reveal information or help to clarify. To select the most suitable filter, simply view the subject through various filters until the best contrast is obtained. For more complete information on the selection and use of filters, see the Kodak Data Book B-1, Kodak Filters and Pola-Screens.

53.4 Lights.

Flash is recommended, especially electronic flash. Conventional tungsten light may melt some materials and hence destroy the fingerprints. Portable ultra-violet lights, or "black lights," which are made for studying minerals, are quite satisfactory for field use with flourescent powders.

53.5 Fingerprint Powders.

Dusting with special powders is by far the most common method of developing fingerprints for photography. Black or grey powder will be suitable for almost all surfaces, but select the powder which provides the best contrast against the background. With fluorescent powders, you do not need to worry about the background.

53.6 Rulers.

The photographic image of fingerprints must be the same size as the original, commonly referred to as 1:1. Two rulers, one in the plane

of the fingerprint and one on the ground glass, simplify camera adjustment. Machinists' rulers, 1 or 2 inches long are recommended.

54. PHOTOGRAPHIC PROCEDURES

54.1 Introduction.

When attempting to make an identification by means of fingerprints, the investigator compares the photograph of the latent fingerprint with the suspect's fingerprints recorded with black ink on white cards, so whatever equipment and materials are used in making the reproduction of latent fingerprints, the final results should be the exact size with black ridges on light background. It must also be laterally correct; that is, not reversed left to right. To satisfy these requirements, it may be necessary to use special photographic techniques. In all fingerprint photographs, you must strive for the best definition and contrast possible.

54.2 Accuracy of Image Size.

It will speed up focusing to remember that for a 1:1 photograph the distance from the film to the center of the lens must be twice the focal length of the lens used, and the distance from the center of the lens to the fingerprint must also be two focal lengths. In other words, the distance from the film to the fingerprint will be four times the focal length with the lens positioned midway between. A good idea is to determine the proper lens position for 1:1 photographs beforehand and mark the position on the camera lens bed. Then in the field, the camera can be adjusted for 1:1 focusing and positioned almost by eye. Then place a ruler in the plane of the fingerprint; and with a second ruler to measure the image on the ground glass, move the whole camera back and forth until the image of the first ruler and the second ruler coincide. (It is not practical to focus at 1:1 by moving the lens alone.) A transparent plastic ruler at the ground glass makes focusing an exact image size much easier.

54.3 Depth-of-Field.

Fingerprints are usually on a flat surface and even when on a curved surface come well within the depth of field at f/16.

54.4 Exposure.

(1) When a lens is extended to focus on subjects closer than eight times its focal length, the values of the lens apertures change and an increase in exposure is required. In 1:1 photography, the resulting effective aperture is two stops smaller than the indicated f-number; and exposure must be increased four times that indicated by an exposure meter.

(2) Overexposure is the most common error in fingerprint photography. Even with a required exposure increase of four times, such as in 1:1 fingerprint photography, sometimes additional adjustments are required to avoid overexposure. The flash can be covered with various thicknesses of white handkerchief: one thickness cuts down the light to the equivalent of one lens stop, two thickness to two stops, etc. Neutral density filters can also be used over the camera lens: A density of 0.30 is equal to one stop, a density of 0.60 to two stops, and a density of 0.90 to three stops.

(3) Several test exposures should be made with lights of different intensities or with a light at different distances to determine the best exposure for a particular combination of equipment. The satisfactory fingerprint negative will have good contrast and will be so sharp that every pore in the skin will be evident in the finished photograph.

55. SPECIFIC TYPES OF FINGERPRINT SUBJECTS

55.1 Clearly Visible Prints on Hard, Smooth Surfaces.

Such prints are often so well-defined that they can be photographed as discovered without treatment. Later, dusting or other treatment can be tried to improve the contrast and the clarity of the pattern.

55.2 Clearly Visible Prints Impressed in Soft Substances.

Fingerprints left in wax, putty, clay, adhesive tape, and grease can usually be photographed without treatment. The use of cross-lighting at a grazing angle will usually give the clearest photograph. Ortho (high-contrast) film will aid in increasing contrast.

55.3 Faint Prints.

Prints which are not clearly visible require dusting or other treatment to produce enough contrast to photograph well. An ortho film such as Kodalith is recommended.

55.4 Almost Invisible Prints.

Prints in dust or on materials which will not allow development with the usual fingerprint powders can sometimes be crosslighted and photographed on high-contrast film. On some surfaces, such as paper, it may be possible to develop these prints by fuming with iodine or other chemical processes. When the prints are raised by fuming with iodine, the camera must be ready beforehand because the image fades quickly. Exposures should be determined by pretesting with your own fingerprint on a similar surface.

56. USE OF FLOURESCENT POWDERS

Flourescent powders are used primarily to eliminate the background around fingerprints. Photographic filters and colored powders often fail to produce sufficient contrast when fingerprints are on multiple-colored background. Highly polished surfaces, such as chromium and the concave surface of a spoon or car cigarette lighter, reflect so much light that even though dusted with black powder the reflection impairs the photographic result. For such subjects, fluorescent fingerprint powders are recommended. Photograph the fluorescent powder by illuminating the area with ultraviolet light in an otherwise darkened room and use a Wratten 2A Filter over the camera lens. The ultraviolet radiation is absorbed, and only the fluorescent illumination is transmitted by the filter and recorded on the film. This technique is described in detail in the Kodak Data Book M-3, "Infrared and Ultraviolet Photography."

57. FINGERPRINTS ON GLASS AND MIRRORS

57.1 The Problem.

Fingerprints on glass and mirrors are difficult to photograph because of the specular reflections of the light source and the double-image problem--the print itself, plus the reflected image from the mirror's surface or the second surface of clear glass.

57.2 Lift First and Then Photograph.

The easiest method of photographing fingerprints on both glass and mirror surfaces is to dust the print with black powder, lift with tape, and photograph the lifted print by the standard technique.

57.3 Beware of Lateral Reversal.

One of the reasons for the rule that it is better to photograph the print before lifting is that the picture of a lift can easily be laterally reversed by mistake. This is particularly true when rubber lifts are photographed. Watch out for this lateral reversal in the transfer process.

CHAPTER 6

TRAFFIC ACCIDENT PHOTOGRAPHY

61. EQUIPMENT

The photographic procedure is straightforward, but it is complicated by the fact that many accidents happen during darkness or storms. Artificial illumination, fast films, easily portable cameras, and a rigid tripod are essential.

62. METHODS

Usually the normal flow of traffic must be resumed as quickly as possible after an accident. The injured must be moved and the cars obstructing traffic must be pulled out of the way. Therefore, the investigator must develop a method whereby he can take the four to eight most valuable pictures in the least possible time. He must learn to limit his pictures to those that are pertinent to the accident and to avoid irrelevancy.

63. RULES

The following simple rules apply to all accidents:

(1) Photographs of the accident scene should be taken from both the eye level and viewpoint of all drivers involved.

(2) When there is a witness, photograph the scene of the accident at the eye level of the witness from the spot where the witness stood.

(3) Try to include a permanent reference point in all photographs, such as a manhole or fire hydrant in town and a culvert or tree when in the country.

(4) Outline with white chalk the position of bodies and the four wheels of vehicles that must be moved.

(5) It is better to make too many photographs than too few. The small cost of a few extra negatives is of no consequence compared to the importance of having photographs from all possible directions when required.

64. PROCEDURE

The following procedure is a suggestion for photographing an accident at an intersection. It will apply equally well for all vehicular accidents involving one or more cars, whether on a straight road, curve, or hill.

(1) Step 1. Make two photographs: (1) Photograph towards the intersection just as the driver saw it, and (2) towards the direction from which the second car involved came. The second shot will show whether or not any obstructions prevented the first driver from seeing the second driver. The camera should be at the driver's eye level.

(2) Step 2. Walk towards the point of impact, and roughly 25 feet from it make negative No. 3, positioning the camera as close as possible to where the driver's eyes were. This will include such items as tire marks or the lack of tire marks, stop signs, crosswalk markers, point of impact, and a permanent reference point such as a manhole.

(3) Step 3. Negative Nos. 4,5, and 6 are a repeat of the first three but taken from the second driver's viewpoint. To save time, take them in reverse order as you walk away from the point of impact.

Step 1, 2, and 3 above are the ones that will interfere with the flow of traffic. All six shots shouldn't take more than three minutes; police officers should assist by holding up traffic, moving spectators back, etc.

(4) Step 4. Photograph each vehicle to show its damaged areas. For identification purposes, photographs should be made of each vehicle including the license plate. Close-ups of the damaged areas are sometimes needed to show the force of the collision. The location of damage may also help to explain how the accident took place. Here, color film is useful, particularly when damage from a previous accident is present, because rusted areas of old damage can then be distinguished from the damage under investigation. If two vehicles of different colors are involved, color photographs will show the color of paint transferred from one car to the other.

(5) Step 5. Photograph skid marks and tire tracks. Do this from two directions: First, end-on to show the direction of the vehicle; second, side-on to show the length. Ordinarily, the camera should be placed as high as possible to give the best view of the marks. Use the painting-with-light technique when the accident scene involves more space than can be lighted with one flash lamp at the camera. In the case of a serious nightime accident, it is often advisable to return to the accident scene the next day and make back-up photographs in day light for record purposes.

65. HIT-AND-RUN ACCIDENTS

The most serious problem in a hit-and-run accident is to identify the missing vehicle. The investigator should take special care to locate and photograph all trace evidence.

CHAPTER 7

PHOTOGRAPHS AS EVIDENCE

71. MUST BE A FAIR AND ACCURATE REPRESENTATION

Drawings, diagrams, maps, and plans have long been used as evidence of the buildings, lands or machines they represent when the things themselves cannot be conveniently brought into court. Since the development of photography, photographs have generally been received in evidence on the same basis as maps and diagrams. Relevancy and materiality of the matter which the photograph represents, are essential to admissibility. However, there must also be testimony that the photograph is a fair and accurate representation of the object or scene which it portrays. If the photograph is not a fair and accurate representation of the object or scene, even though the object or scene may be relevant and material, the photograph will almost certainly not be allowed in evidence.

72. MUST NOT BE UNDULY PREJUDICIAL

The question of admissibility is for the judge and is determined by the rules of exclusion applicable to other types or kinds of evidence. However, because photographs are traditionally susceptible to subjective misinterpretations, the courts have exercised a broader discretion in disallowing them in evidence. Thus, even though a photograph may be a fair and accurate representation of a relevant and material matter, the judge may reject it if in his opinion it would be misleading or would not aid the jury in a better understanding of the facts; and photographs, otherwise admissible, will be rejected if the judge thinks they may create an undue prejudice in the minds of the jury. For example, color pictures of human death or injury that show quantities of blood and gore can create an emotional reaction in the viewer that is far in excess of that warranted by the probative value of the evidence, and the pictures can be excluded for that reason.

73. WHO MAY AUTHENTICATE

(1) The authentication of a photograph prior to its being received in evidence may be done by any witness whose familiarity with the subject matter of the photograph qualifies him to testify that it is a fair and accurate representation of the object or scene it portrays. The testimony of the person who took the picture is not necessary. If the photographer is called as a witness it is not enough that he testify merely that he took the picture. He must be able to say that the picture is a fair and accurate representation of the object or scene.

(2) It is the fairness and accuracy of the representation that is important, and unless the processes and techniques of picture taking,developing and printing are themselves relevant and material on the question of accuracy, the judge may take judicial notice of such processes and techniques. This was not true years ago when photographs were first offered in evidence, and judges often required the testimony of the photographer as an expert witness to authenticate all photographs. Today, the general principles of photography are so well known as applications of the natural laws, that they are properly the subject of judicial notice. Most courts now accept that the central issue is the fairness and accuracy of the representation and not the chemistry behind it.

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KODAK DATAGUIDES

Pocket-size, compact references available from your Kodak dealer.

Title	Code No.
Kodak Color Dataguide	R-19
Kodak Master Darkroom Dataguide	R-20
Kodak Master Photoguide	R-21
Kodak Projection Print Scale	R-26
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KODAK DATA BOOKS

Data Books are available at Kodak dealers. The titles in the following list were carefully selected as being most beneficial for law-enforcement photographers.

Title	Code No.
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