

chapter 2

Introduction

Key Terms

buccal swab

chain of custody

finished sketch

physical evidence

rough sketch

standard/reference sample

substrate control

Learning Objectives

After studying this chapter you should be able to:

- Define physical evidence
- Discuss the responsibilities of the first police officer who arrives at a crime scene
- Explain the steps to be taken to thoroughly record the crime scene
- Describe proper procedures for conducting a systematic search of a crime scene for physical evidence
- Describe proper techniques for packaging common types of physical evidence

- Define and understand the concept of chain of custody
- Relate what steps are typically required to maintain appropriate health and safety standards at the crime scene
- Understand the implications of the *Mincey* and *Tyler* cases

JonBenet Ramsey: Who Did It?

Patsy Ramsey awoke just after five a.m. on December 26, 1996, and walked downstairs to her kitchen. At the foot of the staircase, she found a two-and-a-half-page note saying that her 6-year-old daughter, JonBenet, had been kidnapped. The note contained a ransom demand of \$118,000. Patsy and John Ramsey were in the upper crust of Boulder, Colorado, society. In the span of five short years, John had built his computer company into a billion-dollar corporation. When the police arrived to investigate, it was quite apparent to all that JonBenet was missing. In retrospect, some serious mistakes were made in securing the crime scene—the Ramsey household. Initially, the police conducted a cursory search of the house, but failed to find JonBenet. The house was not sealed off; in fact, four friends along with the Ramsey pastor were let into the home and allowed to move about at will. John was permitted to leave the premises unattended for one and a half hours. One hour after his return, John and two of his friends searched the house again. This time John went down into the basement, where he discovered JonBenet’s body. He removed a white blanket from JonBenet and carried her upstairs, placing the body on the living room floor.

The murder of JonBenet Ramsey remains as baffling a mystery today as it was on its first day. Ample physical evidence exists to support the theory that the crime was committed by an outsider, and also that JonBenet was murdered by someone who resided in the

Ramsey household. Perhaps better care at securing and processing the crime scene could have resolved some of the crime's outstanding questions.

PROCESSING THE CRIME SCENE

As automobiles run on gasoline, crime laboratories “run” on **physical evidence**. Physical evidence encompasses any and all objects that can establish that a crime has been committed or can link a crime and its victim or its perpetrator. But if physical evidence is to be used effectively to aid the investigator, its presence first must be recognized at the crime scene. If all the natural and commercial objects within a reasonable distance of a crime were gathered so that the scientist could uncover significant clues from them, the deluge of material would quickly immobilize the laboratory facility. Physical evidence can achieve its optimum value in criminal investigations only when its collection is performed with a selectivity governed by the collector's thorough knowledge of the crime laboratory's techniques, capabilities, and limitations.

Forthcoming chapters will be devoted to discussions of methods and techniques available to forensic scientists for the evaluation of physical evidence. Although current technology has given the crime laboratory capabilities far exceeding those of past decades, these advances are no excuse for complacency on the part of criminal investigators. Crime laboratories do not solve crimes; only a thorough and competent investigation conducted by professional police officers will enhance the chances for a successful criminal investigation. Forensic science is, and will continue to be, an important element of the total investigative process, but it is only one aspect of an endeavor that must be a team effort. The investigator who believes the crime laboratory to be a panacea for laxity or ineptness is in for a rude awakening.

Forensic science begins at the crime scene. If the investigator cannot recognize physical evi-

dence or cannot properly preserve it for laboratory examination, no amount of sophisticated laboratory instrumentation or technical expertise can salvage the situation. The know-how for conducting a proper crime-scene search for physical evidence is not beyond the grasp of any police department, regardless of its size. With proper training, police agencies can ensure competent performance at crime scenes. In many jurisdictions, police agencies have delegated this task to a specialized team of technicians. However, the techniques of crime-scene investigation are not difficult to master and certainly lie within the bounds of comprehension of the average police officer.

Not all crime scenes require retrieval of physical evidence, and limited resources and personnel have forced many police agencies to restrict their efforts in this area to crimes of a more serious nature. Once the commitment is made to completely process a crime site for physical evidence, however, certain fundamental practices must be followed.

Secure and Isolate the Crime Scene

The first officer arriving on the scene of a crime is responsible for preserving and protecting the area as much as possible. Of course, first priority should be given to obtaining medical assistance for individuals in need of it and to arresting the perpetrator. However, as soon as possible, extensive efforts must be made to exclude all unauthorized personnel from the scene. As additional officers arrive, measures are immediately initiated to isolate the area. See Figure 2–1. Ropes or barricades along with strategic positioning of guards will prevent unauthorized access to the area.

Sometimes the exclusion of unauthorized personnel proves more difficult than expected. Violent crimes are especially susceptible to attention from higher-level police officials and

members of the press, as well as by emotionally charged neighbors and curiosity seekers. Every individual who enters the scene is a potential destroyer of physical evidence, even if it is by unintentional carelessness. If proper control is to be exercised over the crime scene, the officer charged with the responsibility for protecting it must have the authority to exclude everyone, including fellow police officers not directly involved in processing the site or in conducting the investigation. Seasoned criminal investigators are always prepared to relate horror stories about crime scenes where physical evidence was rendered totally valueless by hordes of people who, for one reason or another, trampled through the site. Securing and isolating the crime scene are critical steps in an investigation, the accomplishment of which is the mark of a trained and professional crime-scene investigative team.

Once the scene has been secured, a lead investigator starts evaluating the area. First, he or she determines the boundaries of the scene, and then establishes the perpetrator's path of entry and exit. Logic dictates that obvious items of crime-scene evidence will first come to the attention of the crime-scene investigator. These items must be documented and photographed. The investigator then proceeds with an initial walk-through of the scene to gain an overview of the situation and develop a strategy for systematically examining and documenting the entire crime scene.

Record the Scene

Investigators have only a limited amount of time to work a crime site in its untouched state. The opportunity to permanently record the scene in its original state must not be lost. Such records not only will prove useful during the subsequent investigation but are also required for presentation at a trial in order to document the condition of the crime site and to delineate the location of

physical evidence. Photography, sketches, and notes are the three methods for crime-scene recording (see Figure 2–2). Ideally all three should be employed; however, personnel and monetary limitations often prohibit the use of photography at every crime site. Under these circumstances, departmental guidelines will establish priorities for deploying photographic resources. However, there is no reason not to make sketches and notes at the crime scene.

Photography. The most important prerequisite for photographing a crime scene is for it to be unaltered. Unless injured people are involved, objects must not be moved until they have been photographed from all necessary angles. If objects are removed, positions changed, or items added, the photographs may not be admissible as evidence at a trial, and their intended value will be lost. If evidence has been moved or removed prior to photography, the fact should be noted in the report, but the evidence should not be reintroduced into the scene in order to take photographs.

Each crime scene should be photographed as completely as possible. This means that the crime scene should include the area in which the crime actually took place and all adjacent areas where important acts occurred immediately before or after the commission of the crime. Overview photographs of the entire scene and surrounding area, including points of exit and entry, must be taken from various angles. If the crime took place indoors, the entire room should be photographed to show each wall area. Rooms adjacent to the actual crime site must be similarly photographed. If the crime scene includes a body, photographs must be taken to show the body's position and location relative to the entire scene. Close-up photos depicting injuries and weapons lying near the body are also necessary. After the body is removed from the scene, the surface beneath the body should be photographed.

As items of physical evidence are discovered, they are photographed to show their position

and location relative to the entire scene. After these overviews are taken, close-ups should be taken to record the details of the object itself. When the size of an item is of significance, a ruler or other measuring scale may be inserted near the object and included in the photograph as a point of reference. The digital revolution promises to bring enhanced photographic capabilities to the crime scene. For example, individual images of the crime scene captured with a digital camera can be stitched together electronically to reveal a near three-dimensional panoramic view of the crime scene (see Figure 2–3). With the aid of a computer, any area of the scene captured digitally can be enhanced and examined in fine detail.

The use of videotape at crime scenes is becoming increasingly popular because the cost of this equipment is decreasing. The same principles used in crime-scene photographs apply to videotaping. As with conventional photography, videotaping should include the entire scene and the immediate surrounding area. Long shots as well as close-ups should be taken in a slow and systematic manner. Furthermore, it is desirable to have one crime-scene investigator narrate the events and scenes being taped while another does the actual shooting.

While videotaping can capture the sounds and scenes of the crime site with relative ease, the technique cannot at this time be used in place of still photography. The still photograph remains unsurpassed in the definition of detail it provides to the human eye.

Sketches. Once photographs have been taken, the crime-scene investigator sketches the scene. The investigator may have neither the skill nor the time to make a polished sketch of the scene. However, this is not required during the early phase of the investigation. What is necessary is a **rough sketch** containing an accurate depiction of the dimensions of the scene and showing the location of all objects having a bearing on the case.

A rough sketch is illustrated in Figure 2–4. It shows all recovered items of physical evidence, as well as other important features of the crime scene. Objects are located in the sketch by distance measurements from two fixed points, such as the walls of a room. It is important that distances shown on the sketch be accurate and not the result of a guess or estimate. For this reason, all measurements are made with a tape measure. The simplest way to designate an item in a sketch is to assign it a number or letter. A legend or list placed below the sketch then correlates the letter to the item’s description. The sketch should also show a compass heading designating north.

Unlike the rough sketch, the **finished sketch** in Figure 2–5 is constructed with care and concern for aesthetic appearance. When the finished sketch is completed, it must reflect information contained within the rough sketch in order to be admissible evidence in a courtroom. Computer-aided drafting (CAD) has become the norm to reconstruct crime scenes from rough sketches. The software, ranging from simple, low-cost programs to complex, expensive programs, contains predrawn intersections and roadways or buildings and rooms onto which information can be entered (see Figure 2–6). A generous symbol library provides the operator with a variety of images that can be used to add intricate details such as blood spatters to a crime-scene sketch. Equipped with a zoom function, computerized sketching can focus on a specific area for a more detailed picture. CAD programs allow the operator to select scale size so that the ultimate product can be produced in a size suitable for courtroom presentation.

Notes. Note taking must be a constant activity throughout the processing of the crime scene. These notes must include a detailed written description of the scene with the location of items of physical evidence recovered. They must also identify the time an item of physical evidence was discovered, by whom, how and by whom it was packaged and marked, and the disposition of the

item after it was collected. The note taker has to keep in mind that this written record may be the only source of information for refreshing one's memory months, perhaps years, after a crime has been processed. The notes must be sufficiently detailed to anticipate this need.

Tape-recording notes at a scene can be advantageous—detailed notes can be taped much faster than they can be written. Another method of recording notes is to narrate a videotape of the crime scene. This has the advantage of combining note taking with photography. However, at some point the tape must be transcribed into a written document.

Conduct a Systematic Search for Evidence

The search for physical evidence at a crime scene must be thorough and systematic. For a factual, unbiased reconstruction of the crime, the investigator, relying on his or her training and experience, must not overlook any pertinent evidence. Even when suspects are immediately seized and the motives and circumstances of the crime are readily apparent, a thorough search for physical evidence must be conducted at once. Failure in this, even though it may seem unnecessary, can lead to accusations of negligence or charges that the investigative agency knowingly “covered up” evidence that would be detrimental to its case.

Assigning those responsible for searching a crime scene is a function of the investigator in charge. Except in major crimes, or when the evidence is very complex, it is usually not necessary to have the assistance of a forensic scientist at the crime scene; his or her role appropriately begins with the submission of evidence to the crime laboratory. As has already been observed, some police agencies have trained field evidence technicians to search for physical evidence at the crime scene. They have the equipment and skill to photograph the scene and examine it for the presence of fingerprints, footprints, tool marks, or any other type of evidence that may be

relevant to the crime.

How one conducts a crime-scene search will depend on the locale and size of the area, as well as on the actions of the suspect(s) and victim(s) at the scene. When possible, one person should supervise and coordinate the collection of evidence. Without proper control, the search may be conducted in an atmosphere of confusion with needless duplication of effort. Evidence collectors may subdivide the scene into segments and search each segment individually, or the search may start at some outer point and gradually move toward the center of the scene in a circular fashion (see Figure 2–7). The areas searched must include all probable points of entry and exit used by the criminals.

What to search for will be determined by the particular circumstances of the crime. Obviously, the skill of crime-scene investigators at recognizing evidence and searching relevant locations is paramount to successful processing of the crime scene. While training will impart general knowledge for conducting a proper crime-scene investigation, ultimately the investigator must rely on the experience gained from numerous investigations to formulate a successful strategy for recovering relevant physical evidence at crime scenes. For example, in the case of homicide, the search will center on the weapon and any type of evidence left as a result of contact between the victim and the assailant. The cross-transfer of evidence, such as hairs, fibers, and blood, between individuals involved in the crime is particularly useful for linking suspects to the crime site and for corroborating events that transpired during the commission of the crime. During the investigation of a burglary, efforts will be made to locate tool marks at the point of entry. In most crimes, a thorough and systematic search for latent fingerprints is required.

Vehicle searches must be carefully planned and systematically carried out. The nature of the case determines how detailed the search must be. In hit-and-run cases, the outside and undercar-

riage of the car must be examined with care. Particular attention is paid to looking for any evidence resulting from a cross-transfer of evidence between the car and the victim—this includes blood, tissue, hair, fibers, and fabric impressions. Traces of paint or broken glass may be located on the victim. In cases of homicide, burglary, kidnapping, and so on, all areas of the vehicle, inside and outside, are searched with equal care for physical evidence.

Physical evidence can be anything from massive objects to microscopic traces. Often, many items of evidence are obvious in their presence, but others may be detected only through examination in the crime laboratory. For example, minute traces of blood may be discovered on garments only after a thorough search in the laboratory, or the presence of hairs and fibers may be revealed in vacuum sweepings or on garments only after close laboratory scrutiny. For this reason, it is important to collect possible carriers of trace evidence in addition to more discernible items. Hence, it may be necessary to take custody of all clothing worn by the participants in a crime. Each clothing item should be handled carefully and wrapped separately to avoid loss of trace materials. Critical areas of the crime scene should be vacuumed and the sweepings submitted to the laboratory for analysis. The sweepings from different areas must be collected and packaged separately. A portable vacuum cleaner equipped with a special filter attachment is suitable for this purpose (see Figure 2–8). Additionally, fingernail scrapings from individuals who were in contact with other individuals may contain minute fragments of evidence capable of linking the assailant and victim. The undersurface of each nail is best scraped with a dull object such as a toothpick to avoid cutting the skin. These scrapings will be subjected to microscopic examination in the laboratory.

The search for physical evidence must extend beyond the crime scene to the autopsy room of a deceased victim. Here, the medical examiner or coroner carefully examines the victim to estab-

lish a cause and manner of death. Tissues and organs are routinely retained for pathological and toxicological examination. At the same time, arrangements must be made between the examiner and investigator to secure a variety of items that may be obtainable from the body for laboratory examination. The following are to be collected and sent to the forensic laboratory:

1. Victim's clothing
2. Fingernail scrapings
3. Head and pubic hairs
4. Blood (for DNA typing purposes)
5. Vaginal, anal, and oral swabs (in sex-related crimes)
6. Recovered bullets from the body
7. Hand swabs from shooting victims (for gunshot residue analysis)

Once the body is buried, efforts at obtaining these items may prove difficult or futile. Furthermore, a lengthy time delay in obtaining many of these items will diminish or destroy their forensic value.

In recent years, many police departments have gone to the expense of purchasing and equipping "mobile crime laboratories" (see Figure 2-9) for their evidence technicians. However, the term *mobile crime laboratory* is a misnomer. These vehicles carry the necessary supplies to protect the crime scene; photograph, collect, and package physical evidence; and perform latent print development. They are not designed to carry out the functions of a chemical laboratory. *Crime-scene search vehicle* would be a more appropriate but perhaps less dramatic name for such a vehicle.

Collect and Package Physical Evidence

Physical evidence must be handled and processed in a way that prevents any change from taking place between the time it is removed from the crime scene and the time it is received by the crime laboratory. Changes can arise through contamination, breakage, evaporation, accidental scratching or bending, or loss through improper or careless packaging.

The integrity of evidence is best maintained when the item is kept in its original condition as found at the crime site. Whenever possible, evidence should be submitted to the laboratory intact. Blood, hairs, fibers, soil particles, and other types of trace evidence should not normally be removed from garments, weapons, or other articles that bear them. Instead, the entire object is to be sent to the laboratory for processing. Of course, if evidence is adhering to an object in a precarious manner, good judgment dictates removing and packaging the item. If evidence is found adhering to large structures, such as a door, wall, or floor, common sense must be used; remove the specimen with a forceps or other appropriate tool. In the case of a bloodstain, one has the option of either scraping the stain off the surface, transferring the stain to a moistened swab, or cutting out the area of the object bearing the stain.

Each different item or similar items collected at different locations must be placed in a separate container. Packaging evidence separately prevents damage through contact and prevents cross-contamination.

The well-prepared evidence collector arrives at a crime scene with a large assortment of packaging materials and tools, ready to encounter any type of situation. Forceps and similar tools may have to be used to pick up small items. Unbreakable plastic pill bottles with pressure lids are excellent containers for hairs, glass, fibers, and various other kinds of small or trace evi-

dence. Alternatively, manila envelopes, screw-cap glass vials, or cardboard pillboxes are adequate containers for most trace evidence encountered at crime sites. Ordinary mailing envelopes should not be used as evidence containers because powders and fine particles will leak out of their corners. Small amounts of trace evidence can also be conveniently packaged in a carefully folded paper, using what is known as a “druggist fold.” This consists of folding one end of the paper over one-third, then folding the other end (one-third) over that, and repeating the process from the other two sides. After the paper is folded in this manner, the outside two edges are tucked into each other to produce a closed container that keeps the specimen from falling out.

Although manila envelopes, pillboxes, and sealable plastic bags, as shown in Figure 2–10, are good universal containers for most trace evidence, two frequent finds at crime scenes warrant special attention. If bloodstained materials are stored in airtight containers, the accumulation of moisture may encourage the growth of mold, which can destroy the evidential value of blood. In these instances, wrapping paper, manila envelopes, or paper bags are recommended packaging materials (see Figure 2–11). As a matter of routine, all items of clothing are to be air-dried and placed individually in separate paper bags to ensure constant circulation of air through them. This will prevent the formation of mold and mildew. On the other hand, charred debris recovered from the scene of a suspicious fire must be sealed in an airtight container to prevent the evaporation of volatile petroleum residues. New paint cans or tightly sealed jars are recommended in such situations.

A detailed description of the proper collection and packaging of various types of physical evidence will be discussed in forthcoming chapters; additionally, most of this information is summarized in the evidence guide found in Appendix I.

Maintain the Chain of Custody

Continuity of possession, or the **chain of custody**, must be established whenever evidence is presented in court as an exhibit. Adherence to standard procedures in recording the location of evidence, marking it for identification, and properly completing evidence submission forms for laboratory analysis are the best guarantee that the evidence will withstand inquiries of what happened to it from the time of its finding to its presentation in court. This means that every person who handled or examined the evidence must be accounted for. Failure to substantiate the evidence's chain of custody may lead to serious questions regarding the authenticity and integrity of the evidence and examinations of it.

All items of physical evidence should be carefully packaged and marked upon their retrieval at crime sites. This should be done with the utmost care to avoid destroying their evidential value or restricting the number and kind of examinations to which they may be subjected by the criminalist. If at all possible, the evidence itself should be marked for identification. Normally, the collector's initials and the date of collection are inscribed directly on the article. However, if the evidence collector is unsure of the necessity of marking the item itself, or has doubts as to where to mark it, it is best to omit this step. When appropriate, the evidence is to be tagged for identification. Once an evidence container is selected for the evidence, whether a box, bag, vial, or can, it also must be marked for identification. A minimum record would show the collector's initials, location of the evidence, and date of collection. If the evidence is turned over to another individual for care or delivery to the laboratory, this transfer must be recorded in notes and other appropriate forms. In fact, every individual who possesses the evidence must maintain a written record of its acquisition and disposition. Frequently, all of the individuals involved in the collection and transportation of the evidence may be requested to testify in court. Thus, to avoid confusion and

to retain complete control of the evidence at all times, the chain of custody should be kept to a minimum.

Obtain Standard/Reference Samples

The examination of evidence, whether soil, blood, glass, hair, fibers, and so on, often requires comparison with a known **standard/reference sample**. Although most investigators have little difficulty recognizing and collecting relevant crime-scene evidence, few seem aware of the necessity and importance of providing the crime lab with a thorough sampling of standard/reference materials. Such materials may be obtained from the victim, a suspect, or other known sources. For instance, investigation of a hit-and-run incident might require the removal of standard/reference paint from a suspect vehicle. This will permit its comparison to paint recovered at the scene. Similarly, hair found at the crime scene will be of optimum value only when compared to standard/reference hairs removed from the suspect and victim. Likewise, blood-stained evidence must be accompanied by a whole-blood or **buccal swab** standard/reference sample obtained from all relevant crime-scene participants. The quality and quantity of standard/reference specimens often determine the evidential value of crime-scene evidence, and these standard/reference specimens must be treated with equal care.

Some types of evidence must also be accompanied by the collection of **substrate controls**. These are materials adjacent or close to areas where physical evidence has been deposited. For example, substrate controls are normally collected at arson scenes. If an investigator suspects that a particular surface has been exposed to gasoline or some other accelerant, the investigator should also collect a piece of the same surface material that is believed *not* to have been exposed to the accelerant. At the laboratory, the substrate control is tested to ensure that the surface on

which the accelerant was deposited does not interfere with testing procedures. Another common example of a substrate control is a material on which a bloodstain has been deposited. Unstained areas close to the stain may be sampled for the purpose of determining whether this material will have an impact on the interpretation of laboratory results.

Thorough collection and proper packaging of standard/reference specimens and substrate controls are the mark of a skilled investigator.

Submit Evidence to the Laboratory

Evidence is usually submitted to the laboratory either by personal delivery or by mail shipment. The method of transmittal is determined by the distance the submitting agency must travel to the laboratory and the urgency of the case. If the evidence is delivered personally, the deliverer should be familiar with the case, to facilitate any discussions between laboratory personnel and the deliverer concerning specific aspects of the case.

If desired, most evidence can be conveniently shipped by mail. However, postal regulations restrict the shipment of certain chemicals and live ammunition and prohibit the mailing of explosives. In such situations, the laboratory must be consulted to determine the disposition of these substances. Care must also be exercised in the packaging of evidence in order to prevent breakage or other accidental destruction while it is in transit to the laboratory.

Most laboratories require that an evidence submission form accompany all evidence submitted. One such form is shown in Figure 2–12. This form must be properly completed. Its information will enable the laboratory analyst to make an intelligent and complete examination of the evidence. Particular attention should be paid to providing the laboratory with a brief description of the case history. This information will allow the examiner to analyze the specimens in a logi-

cal sequence and make the proper comparisons, and it will also facilitate the search for trace quantities of evidence.

The particular kind of examination requested for each type of evidence is to be delineated. However, the analyst will not be bound to adhere strictly to the specific tests requested by the investigator. As the examination proceeds, new evidence may be uncovered, and as a result the complexity of the case may change. Furthermore, the analyst may find the initial requests incomplete or not totally relevant to the case. Finally, a list of items submitted for examination must be included on the evidence submission form. Each item is to be packaged separately and assigned a number or letter, which should be listed in an orderly and logical sequence on the form.

Ensure Crime-Scene Safety

The increasing spread of AIDS and hepatitis B has sensitized the law enforcement community to the potential health hazards at crime scenes. Law enforcement officers have an extremely small chance of contracting AIDS or hepatitis at the crime scene. Both diseases are normally transmitted by the exchange of body fluids, such as blood, semen, and vaginal and cervical secretions; intravenous drug needles and syringes; and transfusion of infected blood products. However, the presence of blood and semen at crime scenes presents the investigator with biological specimens of unknown origin; the investigator has no way of gauging what health hazards they may contain. Therefore, caution and protection must be used at all times.

Fortunately, inoculation can easily prevent hepatitis B infection in most people. Furthermore, the federal Occupational Safety and Health Administration (OSHA) requires that law enforcement agencies offer hepatitis B vaccinations to all officers who may have contact with body flu-

ids while on the job, at no expense to the officer.

The International Association for Identification Safety Committee has proposed the following guidelines to protect investigators at crime scenes containing potentially infectious materials:

1. Forensic and crime-scene personnel may encounter potentially infectious materials, such as in the case of a homicide, in which blood or body fluids may be localized to the area of the body or dispersed throughout the crime scene. At such scenes, it is recommended that personnel wear a minimum of latex gloves (double gloved) and protective (Tyvek-type) shoe covers. In cases of large contamination areas, liquid repellent coveralls (Tyvek or Kleengard suits) are recommended along with the gloves and shoe covers.
2. The use of a particle mask/respirator, goggles, or face shield is recommended in addition to the protective items listed in item 1 when potentially infectious dust or mist may be encountered at the crime scene. This includes the collection of dried bloodstains by scraping; the collection, folding, and preservation of garments that may be contaminated with blood or body fluids, especially if they are in a dried state; and the application of aerosol chemicals to bloodstains or prints for their detection and/or enhancement.
3. When processing and collecting evidence at a crime scene, personnel should be alert to sharp objects, knives, hypodermic syringes, razor blades, and similar items. In the event that such sharp objects are encountered and must be recovered as evidence, the items should be placed in an appropriate container and properly labeled. When conventional latent-print powder techniques are used in or around areas contaminated with blood, a specific brush should be designated so that it can be subsequently decontaminated or appropriately disposed of after processing is complete. If latents are developed in or around blood-contaminated areas, they

should be photographed, or lifted and placed in a sealed plastic bag. The sealed bag then should be affixed with an appropriate biohazard label.

Evidence collected for transport should be packaged to maintain its integrity and to prevent contamination of personnel or personal items. Evidence contaminated with wet blood should first be placed in a paper bag and then temporarily stored in a red biohazard plastic bag for immediate transport to an appropriate drying facility.

4. When potentially infectious materials are present at a crime scene, personnel should maintain a red biohazard plastic bag for the disposal of contaminated gloves, clothing, masks, pencils, wrapping paper, and so on. On departure from the scene, the biohazard bag must be taped shut and transported to an approved biohazardous waste pickup site.
5. Note taking should be done while wearing uncontaminated gloves to avoid contamination of pens, pencils, notebook, paper, and so on. Pens or markers used to mark and package contaminated evidence should be designated for proper disposal in a red biohazard bag before investigators leave the crime scene.
6. If individual protective equipment becomes soiled or torn, it must be removed immediately. Personnel must then disinfect/decontaminate the potentially contaminated body areas using a recommended solution, such as a 10 percent bleach solution, or an antimicrobial soap or towelette. After cleansing, the area must be covered with clean, replacement protective equipment. On departure from the scene, this procedure should be repeated on any body area where contamination could have occurred.
7. Eating, drinking, smoking, and application of makeup are prohibited at the immediate crime scene.

8. All nondisposable items, such as lab coats, towels, and personal clothing, that may be contaminated with potentially infectious material should be placed in a yellow plastic bag labeled “Infectious Linen” and laundered, at the expense of the employer, by a qualified laundry service. Personal clothing that may have been contaminated should never be taken home for cleaning.

LEGAL CONSIDERATIONS AT THE CRIME SCENE

In police work, there is perhaps no experience more exasperating or demoralizing than to watch valuable evidence excluded from use against the accused because of legal considerations. This situation most often arises from what is deemed an “unreasonable” search and seizure of evidence. Therefore, the removal of any evidence from a person or from the scene of a crime must be done in conformity with Fourth Amendment privileges: “The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizure, shall not be violated, and no warrants shall issue, but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.”

Since the 1960s, the Supreme Court has been particularly concerned with defining the circumstances under which the police can search for evidence in the absence of a court-approved search warrant. A number of allowances have been made to justify a warrantless search: (1) the existence of emergency circumstances, (2) the need to prevent the immediate loss or destruction of evidence, (3) a search of a person and property within the immediate control of the person provided it is made incident to a lawful arrest, and (4) a search made by consent of the parties involved. In cases other than these, police must be particularly cautious about processing a crime scene without a search warrant. In 1978, the Supreme Court addressed this very issue and in so

doing set forth guidelines for investigators to follow in determining the propriety of conducting a warrantless search at a crime scene. Significantly, the two cases decided on this issue related to homicide and arson crime scenes, both of which are normally subjected to the most intensive forms of physical evidence searches by police.

In the case of *Mincey v. Arizona*,¹ the Court dealt with the legality of a four-day search at a homicide scene. The case involved a police raid on the home of Rufus Mincey, who had been suspected of dealing drugs. Under the pretext of buying drugs, an undercover police officer forced entry into Mincey's apartment and was killed in a scuffle that ensued. Without a search warrant, the police spent four days searching the apartment, recovering, among other things, bullets, drugs, and drug paraphernalia. These items were subsequently introduced as evidence at the trial. Mincey was convicted and on appeal contended that the evidence gathered from his apartment, without a warrant and without his consent, was illegally seized. The Court unanimously upheld Mincey's position, stating:

We do not question the right of the police to respond to emergency situations. Numerous state and federal cases have recognized that the Fourth Amendment does not bar police officers from making warrantless entries and searches when they reasonably believe that a person within is in need of immediate aid. Similarly, when the police come upon the scene of a homicide they may make a prompt warrantless search of the area to see if there are other victims or if a killer is still on the premises.... Except for the fact that the offense under investigation was a homicide, there were no exigent circumstances in this case.... There was no indication that evidence would be lost, destroyed or removed during the time required to obtain a search warrant. Indeed, the police guard at the apartment mini-

mized that possibility. And there is no suggestion that a search warrant could not easily and conveniently have been obtained. We decline to hold that the seriousness of the offense under investigation itself creates exigent circumstances of the kind that under the Fourth Amendment justify a warrantless search.

In *Michigan v. Tyler*,² a business establishment leased by Loren Tyler and a business partner was destroyed by fire. The fire was finally extinguished in the early hours of the morning; however, hampered by smoke, steam, and darkness, fire officials and police were prevented from thoroughly examining the scene for evidence of arson. The building was then left unattended until eight a.m. of that day, when officials returned and began an inspection of the burned premises. During the morning search, assorted items of evidence were recovered and removed from the building. On three other occasions—four days, seven days, and twenty-five days after the fire—investigators reentered the premises and removed additional items of evidence. Each of these searches was made without a warrant or without consent, and the evidence seized was used to convict Tyler and his partner of conspiracy to burn real property and related offenses. The Supreme Court upheld the reversal of the conviction, holding the initial morning search to be proper but contending that evidence obtained from subsequent reentries to the scene was inadmissible: “We hold that an entry to fight a fire requires no warrant, and that once in the building, officials may remain there for a reasonable time to investigate the cause of a blaze. Thereafter, additional entries to investigate the cause of the fire must be made pursuant to the warrant procedures.”

The message from the Supreme Court is clear: When time and circumstances permit, obtain a search warrant before investigating and retrieving physical evidence at the crime scene.

Chapter Summary

Physical evidence includes any and all objects that can establish that a crime has been committed or can link a crime and its victim or its perpetrator. Forensic science begins at the crime scene. Here, investigators must recognize and properly preserve evidence for laboratory examination. The first officer to arrive is responsible for securing the crime scene. Once the scene is secured, relevant investigators record the crime scene by using photographs, sketches, and notes. Before processing the crime scene for physical evidence, the investigator should make a preliminary examination of the scene as it was left by the perpetrator. The search for physical evidence at a crime scene must be thorough and systematic. The search pattern selected normally depends on the size and locale of the scene and the number of collectors participating in the search.

Physical evidence can be anything from massive objects to microscopic traces. Often, many items of evidence are clearly visible but others may be detected only through examination at the crime laboratory. For this reason, it is important to collect possible carriers of trace evidence, such as clothing, vacuum sweepings, and fingernail scrapings, in addition to more discernible items. Each different item or similar items collected at different locations must be placed in a separate container. Packaging evidence separately prevents damage through contact and prevents cross-contamination.

During the collection of evidence, the chain of custody, a record for denoting the location of the evidence, must be maintained. In addition, proper standard/reference samples, such as hairs, blood, and fibers, must be collected at the crime scene and from appropriate subjects for comparison in the laboratory. The removal of any evidence from a person or from the scene of a crime must be done in accordance with appropriate search and seizure protocols.

Review Questions

1. The term _____ encompasses all objects that can establish whether a crime has been committed or can link a crime and its victim or its perpetrator.
2. True or False: Scientific evaluation of crime-scene evidence can usually overcome the results of a poorly conducted criminal investigation. _____
3. True or False: The techniques of physical evidence collection require a highly skilled individual who must specialize in this area of investigation. _____
4. All unauthorized personnel must be _____ from crime scenes.
5. Three methods for recording the crime scene are _____, _____, and _____.
6. The most important prerequisite for photographing a crime scene is to have it in a(n) _____ condition.
7. Photographs of physical evidence must include overviews as well as _____ to record the details of objects.
8. An investigator need only draw a(n) _____ sketch at the crime scene to show its dimensions and pertinent objects.
9. A detailed search of the crime scene for physical evidence must be conducted in a(n) _____ manner.
10. Besides the more obvious items of physical evidence, possible _____ of trace evidence must be collected for detailed examination in the laboratory.

11. In cooperation with the medical examiner or coroner, evidence retrieved from a deceased victim to be submitted to the crime laboratory should include _____, _____, _____, _____, _____, and _____.
12. Whenever possible, trace evidence (is, is not) to be removed from the object that bears it.
13. Each item collected at the crime scene must be placed in a(n) _____ container.
14. True or False: An ordinary mailing envelope is considered a good general-purpose evidence container. _____
15. An airtight container (is, is not) recommended packaging material for bloodstained garments.
16. As a matter of routine, all items of clothing are to be _____ before packaging.
17. True or False: Charred debris recovered from the scene of an arson is best placed in a porous container. _____
18. The possibility of future legal proceedings requires that a(n) _____ be established with respect to the possession and location of physical evidence.
19. Most physical evidence collected at the crime site will require the accompanying submission of _____ material for comparison purposes.
20. In the case of *Mincey v. Arizona*, the Supreme Court restricted the practice of conducting a(n) _____ search at a homicide scene.
21. In the case of *Michigan v. Tyler*, the Supreme Court dealt with search and seizure procedures at a(n) _____ scene.

Further References

Geberth, Vernon J., *Practical Homicide Investigation: Tactics, Procedures, and Forensic Techniques*, 4th ed. Boca Raton, Fla.: Taylor & Francis, 2006.

Nickell, J., and J. F. Fischer, *Crime Scene: Methods of Forensic Detection*. Lexington: University Press of Kentucky, 1999.

Ogle, R. R., Jr., *Crime Scene Investigation and Reconstruction*. Upper Saddle River, N.J.: Prentice Hall, 2004.

Osterburg, James W., and Richard H. Ward, *Criminal Investigation—A Method for Reconstructing the Past*, 3rd ed. Cincinnati, Ohio: Anderson, 2000.

Case Study

The Enrique Camarena Case: A Forensic Nightmare

Undated photo of Enrique Camarena. *Courtesy AP Wide World Photos*

Reprinted from *FBI Law Enforcement Bulletin*, September 1989.

On February 7, 1985, U.S. Drug Enforcement Agency (DEA) Special Agent (SA) Enrique Camarena was abducted near the U.S. Consulate in Guadalajara, Mexico. A short time later, Capt. Alfredo Zavala, a DEA source, was also abducted from a car near the Guadalajara Airport. These two abductions would trigger a series of events leading to one of the largest investigations ever conducted by the DEA and would result in one of the most extensive cases ever received by the FBI Laboratory.

Throughout this lengthy investigation, unusual forensic problems arose that required unusual solutions. Eventually, numerous suspects were arrested, both in the United States and Mexico, which culminated in an 8-week trial held in U.S. District Court in Los Angeles, CA.

The Abduction

On February 7, 1985, SA Camarena left the DEA Resident Office to meet his wife for lunch. On this day, a witness observed a man being forced into the rear seat of a light-colored compact car in front of the Camelot Restaurant and provided descriptions of several of the assailants. After some initial reluctance, Primer Comandante Pavon-Reyes of the Mexican Federal Judicial Police (MFJP) was put in charge of the investigation, and Mexican investigators were assigned to the case. Two known drug traffickers, Rafael Caro-Quintero and Ernesto Fonseca, were quickly developed as suspects. A short time later at the Guadalajara Airport, as Caro-Quintero and his men attempted to flee by private jet, a confrontation developed between Caro-Quintero's men, the MFJP, and DEA agents. After some discussion, Caro-Quintero and his men were permitted to board and leave. It was later learned that a 6-figure bribe had been paid to Pavon-Reyes to allow this departure.

The Investigation

During February 1985, searches of several residences and ranches throughout Mexico proved fruitless, despite the efforts of the DEA task force assigned to investigate this matter and the tremendous pressure being applied by the U.S. Government to accelerate the investigation. High-level U.S. government officials, as well as their Mexican counterparts, were becoming directly involved in the case. It is believed that because of this "heat," the Mexican drug traffickers and certain Mexican law enforcement officials fabricated a plan. According to the plan, the MFJP would receive an anonymous letter indicating that SA Camarena and Captain Zavala were being held at the Bravo drug gang's ranch in La Angostura, Michoacan, approximately 60 miles south-east of Guadalajara. The MFJP was supposed to raid the ranch, eliminate the drug gang, and eventually discover the bodies of SA Camarena and Captain Zavala buried on the ranch. The

DEA would then be notified and the case would be closed. Thus, the Bravo gang would provide an easy scapegoat.

During early March, MFJP officers raided the Bravo ranch before the DEA Agents arrived. In the resulting shootout, all of the gang members, as well as one MFJP officer, were killed. However, due to a mix-up, the bodies of SA Camarena and Captain Zavala were not buried on the Bravo ranch in time to be discovered as planned. The individuals paid to do this job simply left them by the side of a road near the ranch. It was later learned that certain Mexican law enforcement officials were paid a large sum of money to formulate and carry out this plan in order to obstruct and prematurely conclude the investigation.

Shortly after this shootout, a passerby found two partially decomposed bodies, wrapped in plastic bags, along a road near the Bravo ranch. The bodies were removed and transported to a local morgue where they were autopsied. The DEA was then advised of the discovery of the bodies and their subsequent removal to another morgue in Guadalajara, where a second autopsy was performed.

On March 7, 1985, the FBI dispatched a forensic team to Guadalajara. They immediately proceeded to the morgue to identify the bodies and to process any evidence which might be present. After much bureaucratic delay from the local officials, they were finally allowed to proceed. The bodies were identified only as cadavers number 1 and number 2. It was apparent that each body had been autopsied and that both were in an advanced state of decomposition. Cadaver number 1 was quickly identified by the fingerprint expert as that of SA Camarena. Mexican officials would not allow the second body to be identified at this time; however, it was later identified through dental records as Captain Zavala.

The FBI forensic team requested permission to process the clothing, cordage, and burial sheet found with the bodies but the request was denied. However, they were allowed to cut small, “known” samples from these items and obtain hair samples from both bodies. Soil samples were also removed from the bodies and the clothing items.

A forensic pathologist from the Armed Forces Institute of Pathology was allowed to examine the body of SA Camarena. He concluded that SA Camarena’s death was caused by blunt-force injuries. In addition, SA Camarena had a hole in his skull caused by a rod-like instrument. SA Camarena’s body was then released to the American officials and immediately flown to the United States.

The next day, both FBI and DEA personnel proceeded to the Bravo ranch where the bodies were initially found. Because this site had been a completely uncontrolled crime scene, contaminated by both police personnel and onlookers, only a limited crime-scene search was conducted. It was immediately noted that there was no grave site in the area and that the color of the soil where the bodies had been deposited differed from the soil that had been removed from the bodies. Therefore, “known” soil samples from the drop site were taken to compare with soil removed from the victims. It was also noted that there were no significant body fluids at the “burial” site. This led the forensic team to conclude that the bodies had been buried elsewhere, exhumed, and transported to this site.

The MFJP officials were later confronted with the evidence that the bodies had been relocated to the Michoacan area. This was one of the factors which led to a new, unilateral MFJP investigation. As a result, several suspects, including State Judicial Police Officers, were arrested and interrogated concerning the kidnapping of SA Camarena. Primer Comandante Pavon-Reyes was fired, and arrest warrants were issued for a number of international drug traffickers, including

Rafael Caro-Quintero and Ernesto Fonseca.

In late March 1985, DEA agents located a black Mercury Gran Marquis which they believed was used in the kidnapping or transportation of SA Camarena. The vehicle had been stored in a garage in Guadalajara, and a brick wall had been constructed at the entrance to conceal it. The vehicle was traced to a Ford dealership owned by Caro-Quintero. Under the watchful eye of the MFJP at the Guadalajara Airport, the FBI forensic team processed the vehicle for any hair, fiber, blood, and/or fingerprint evidence it might contain.

During April 1985, the MFJP informed the DEA that they believed they had located the residence where SA Camarena and Captain Zavala had been held. The FBI forensic team was immediately dispatched to Guadalajara; however, they were not allowed to proceed to the residence, located at 881 Lope De Vega, until an MFJP forensic team had processed the residence and had removed all of the obvious evidence. The DEA was also informed that since the abduction of SA Camarena, all of the interior walls had been painted, the entire residence had recently been cleaned, and that a group of MFJP officers were presently occupying, and thereby contaminating, the residence.

On the first day after the arrival of the FBI forensic team, they surveyed and began a crime scene search of the residence and surrounding grounds. The residence consists of a large, two-story structure with a swimming pool, covered patio, aviary, and tennis court surrounded by a common wall. The most logical place to hold a prisoner at this location would be in the small outbuilding located to the rear of the main residence. This outbuilding, designated as the "guest house," consisted of a small room, carpeted by a beige rug, with an adjoining bathroom. The entire room and bathroom were processed for hairs, fibers, and latent fingerprints. The single door into this room was made of steel and reinforced by iron bars. It was ultimately determined by means of testi-

mony and forensic evidence that several individuals interrogated and tortured SA Camarena in this room. In addition, a locked bedroom, located on the second floor of the main house, was also processed, and the bed linens were removed from a single bed. Known carpet samples were taken from every room in the residence.

A beige VW Atlantic, which fit the general description of the smaller vehicle noted by the person who witnessed SA Camarena's abduction, was parked under a carport at the rear of the residence. The VW Atlantic was also processed for hairs, fibers, and fingerprints.

On the second day, a thorough grounds search was conducted. As FBI forensic team members were walking around the tennis court, they caught a glimpse of something blue in one of the drains. Upon closer inspection, it appeared to be a folded license plate, at the bottom of the drain. However, a heavy iron grate covered the drain and prevented the plate's immediate retrieval.

When one of the FBI agents returned to the main house to ask the MFJP officers for a crowbar, they became extremely curious and followed the agent as he returned, empty handed, to the tennis court. By this time, a second agent had managed to remove the grate by using a heavy-wire coat hanger. The license plate was retrieved, unfolded, and photographed. The MFJP officers, all of whom were now at the tennis court, became upset at this discovery, and one of them immediately contacted his superior at MFJP headquarters, who ordered them to secure the license plate until the Assistant Primer Comandante arrived on the scene. After his arrival approximately 20 minutes later, he seized the license plate and would not allow the Americans to conduct any further searches.

However, by this time, five very large plastic bags of evidence had been recovered and were placed in the rear of a DEA truck. The evidence was quickly transported to the DEA vault in the

U.S. Consulate.

After negotiations between the United States and Mexico, the MFJP did allow a second, final search of the residence. On June 24, 1985, a forensic team returned and processed the four remaining rooms on the first floor of the main house.

By this point in the investigation, an associate of Rafael Caro-Quintero had been arrested and interrogated by the MFJP. He stated that the bodies of two Americans, Albert Radelat and John Walker, who had been abducted and killed by Mexican drug traffickers, were buried on the south side of La Primavera Park, a large, primitive park west of Guadalajara. The bodies of Radelat and Walker were located and recovered. Soil samples taken from the surface of an area near their graves were similar in most respects to the soil recovered earlier from the bodies of SA Camarena and Captain Zavala.

In September 1985, DEA personnel went to La Primavera Park and sampled an area approximately 2 feet below the surface near the same site. This sample matched the soil samples from SA Camarena and Captain Zavala almost grain for grain, indicating that this site was almost certainly their burial site before they were relocated to the Bravo ranch.

Later that fall, after further negotiations between the U.S. and the Mexican governments, permission was finally granted for an FBI forensic team to process the evidence seized by the MFJP forensic team from 881 Lope De Vega the previous April. The evidence consisted of small samples the MFJP had taken of SA Camarena's burial sheet, a piece of rope used to bind SA Camarena, a portion of a pillowcase removed from bedroom number 3, a piece of unsoiled rope removed from the covered patio, and a laboratory report prepared by the MFJP Crime Laboratory. The remainder of the evidence had been destroyed for "health reasons."

In January 1986, a drug trafficker named Rene Verdugo, who was considered to be a high-ranking member of the Caro-Quintero gang, was apprehended and taken to San Diego, where he was arrested by the DEA. He was then transported to Washington, D.C., where hair samples were taken. He refused to testify before a federal grand jury investigating the Camarena case. Later that year, DEA personnel obtained hair samples in Mexico City from Sergio Espino-Verdin, a former federal comandante, who is believed to have been SA Camarena's primary interrogator during his ordeal at 881 Lope De Vega.

The Trial

In July 1988, the main trial of the murder, interrogation, and abduction of SA Camarena began in U.S. District Court in Los Angeles, CA. The forensic evidence presented in this trial identified 881 Lope De Vega as the site where SA Camarena had been held. [See Figure 1.] The evidence also strongly associated two Mexican citizens, Rene Verdugo and Sergio Espino-Verdin, with the "guest house" at 881 Lope De Vega. Several types of forensic evidence were used to associate SA Camarena with 881 Lope De Vega: forcibly removed head hairs, found in the "guest house" and bedroom number 4, in the VW Atlantic and in the Mercury Gran Marquis, and two types of polyester rug fibers, a dark, rose-colored fiber and a light-colored fiber. [See Figures 2 and 3.] Fabric evidence was also presented, which demonstrated the similarities of color, composition, construction, and design between SA Camarena's burial sheet and the two pillowcases recovered from bedrooms number 3 and 5.

Based on this evidence associating SA Camarena and 881 Lope De Vega, the FBI Laboratory examiner was able to testify that SA Camarena was at this residence, as well as in the VW Atlantic and the Mercury Gran Marquis, and that he had been in a position such that his head hairs were forcibly removed. Captain Alfredo Zavala was also found to be associated with the "guest

house” at 881 Lope De Vega. Light-colored nylon rug fibers, found on samples of his clothing taken at the second autopsy, matched the fibers from the “guest house” carpet.

A detailed model of the residence at 881 Lope De Vega was prepared by the Special Projects Section of the FBI Laboratory for the trial. [See Figure 4.] Over 20 trial charts were also prepared to explain the various types of forensic evidence. These charts proved invaluable in clarifying the complicated techniques and characteristics used in the examination of the hair, fiber, fabric, and cordage evidence. [See Figure 5.]

Conclusion

The forensic pitfalls and problems in this case (i.e., destruction of evidence, contamination of crime scenes) were eventually resolved. In some cases, certain routine procedures had to be ignored or unconventional methods employed. However, in many instances, detailed trial testimony overcame the limitations of certain evidence, and eventually, almost all of the evidence introduced at the trial made a tremendous impact on the outcome of this proceeding. After an 8-week trial, conducted under tight security and involving hundreds of witnesses, all of the defendants were found guilty, convicted on all counts, and are currently serving lengthy sentences.

Physical Evidence

Any object that can establish that a crime has been committed or can link a crime and its victim or its perpetrator.

WebExtra 2.1

Making a Photographic Record of the Crime Scene

www.prenhall.com/Saferstein

Rough Sketch

A draft representation of all essential information and measurements at a crime scene. This sketch is drawn at the crime scene.

Finished Sketch

A precise rendering of the crime scene, usually drawn to scale.

Chain of Custody

A list of all people who came into possession of an item of evidence.

Standard/Reference Sample

Physical evidence whose origin is known, such as blood or hair from a suspect, that can be compared to crime-scene evidence.

Buccal Swab

A swab of the inner portion of the cheek; cheek cells are usually collected to determine the DNA profile of an individual.

Substrate Control

Uncontaminated surface material close to an area where physical evidence has been deposited. This sample is to be used to ensure that the surface on which a sample has been deposited does not interfere with laboratory tests.

WebExtra 2.2**Patricia Cornwell's Challenge**

www.prenhall.com/Saferstein

Michael P. Malone

Special Agent, Laboratory Division

Federal Bureau of Investigation, Washington, D.C.

Figure 2–1 The first investigators to arrive must secure the crime scene and establish the crime-scene perimeter. *Courtesy Sirchie Finger Print Laboratories, Inc., Youngsville, N.C., www.sirchie.com*

Figure 2–2 The finding of an evidential cigarette butt at the crime scene requires photographing it, making a sketch showing its relation to the crime scene, and recording the find in field notes. *Courtesy Police Science Services, Niles, Ill.*

Figure 2–3 Individual images (top) are shown before being electronically stitched together into a single panoramic image (bottom). Individual photographs should be taken with about a 30 percent overlap. *Courtesy Imaging Forensics, Fountain Valley, Calif., www.imagingforensics.com*

Figure 2–4 Rough-sketch diagram of a crime scene. *Courtesy Sirchie Finger Print Laboratories, Inc., Youngsville, N.C., www.sirchie.com*

Figure 2–5 Finished-sketch diagram of a crime scene. *Courtesy Sirchie Finger Print Laboratories, Inc., Youngsville, N.C., www.sirchie.com*

Figure 2–6 Construction of a crime-scene diagram with the aid of a computer-aided drafting program. *Courtesy Sirchie Finger Print Laboratories, Inc., Youngsville, N.C., www.sirchie.com*

Figure 2–7 Several typical examples of crime-scene search patterns. The pattern selected

normally depends on the size and locale of the scene and the number of collectors participating in the search.

Figure 2–8 Vacuum sweeper attachment, constructed of clear plastic in two pieces that are joined by a threaded joint. A metal screen is mounted in one half to support a filter paper to collect debris. The unit attaches to the hose of the vacuum sweeper. After a designated area of the crime scene is vacuumed, the filter paper is removed and retained for laboratory examination. *Courtesy Sirchie Finger Print Laboratories, Inc., Youngsville, N.C., www.sirchie.com*

Figure 2–9 Inside view of a mobile crime-scene van: (a) driver’s side and (b) passenger’s side. *Courtesy Sirchie Finger Print Laboratories, Inc., Youngsville, N.C., www.sirchie.com*

Figure 2–10 (a) Manila evidence envelope, (b) metal pillboxes, (c) sealable plastic evidence bag. *Courtesy Sirchie Finger Print Laboratories, Inc., Youngsville, N.C., www.sirchie.com*

Figure 2–11 Paper bags are recommended evidence containers for objects suspected of containing blood and semen stains. Each object should be packaged in a separate bag. *Courtesy Sirchie Finger Print Laboratories, Inc., Youngsville, N.C., www.sirchie.com*

Figure 2–12 An example of a properly completed evidence submission form. *Courtesy New Jersey State Police*

Figure 1 Diagram of the 881 Lope De Vega grounds. Camarena was held prisoner in the guest house.

Figure 2 Trial chart showing hair comparisons between known Camarena hairs and hairs recovered from 881 Lope De Vega.

Figure 3 Trial chart showing hair comparisons between known Camarena hairs and hairs recovered from the Mercury Gran Marquis.

Figure 4 A model of 881 Lope De Vega prepared as a trial exhibit.

Figure 5 Trial chart used to show the association of Camarena and Zavala with various locations.

¹ 437 U.S. 385 (1978).

² 436 U.S. 499 (1978).