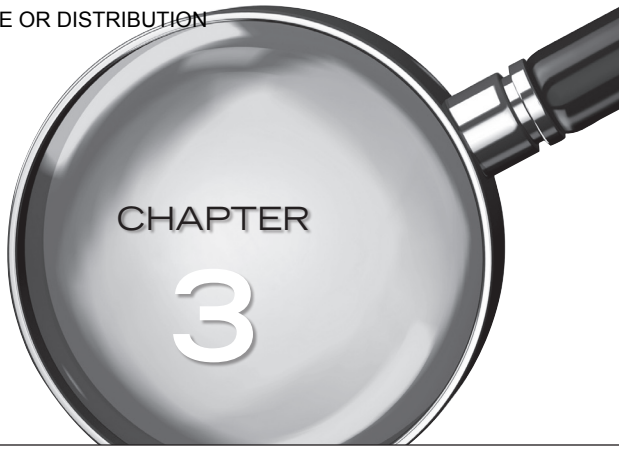

The Crime Scene

STUDENT LEARNING OUTCOMES

Upon completion of this chapter, students will demonstrate an understanding of:

- The responsibility of all the members of the crime scene team
- How to process crime scenes big and small
- The use of templates and virtual photography in constructing crime scene sketches
- The importance of taking crime scene notes
- The importance of recording/documenting the crime scene

No matter what the crime or where the location, no two crime scenes are ever the same. Each crime scene encompasses not only the geographic area but also persons and things. Protecting the area is pointless if what is contained within it is not also protected. The entryways and exits and travel routes to and from the scene must similarly be guarded against contamination. The geographic area and the material objects within it usually can be secured easily. More difficult is preserving the people on the crime scene. Yet they must be preserved as meticulously as any other evidence.

All crime scenes contain physical evidence, that is, evidence that can be touched, seen, or otherwise perceived using the unaided senses or forensic techniques. The difficult task is to determine what is evidence and what is not. However, it is better to process too much evidence than too little. Experience will help an investigator begin to pare down what is taken from a crime scene. Each crime has its own set of evidence parameters that help in distinguishing evidence from non-evidence.

Anything taken from the crime scene should be instrumental in discovering the facts. Keep in mind that the evidence reveals the facts; when the evidence is inconsistent with a hypothesis, the hypothesis must be changed to fit the evidence—not the other way around. Numerous court cases have reduced the significance of suspects' confessions and highlighted the key role of evidentiary corroboration. The importance of crime scene processing continues to increase. Not all evidence is recognized readily as such. Often, seemingly insignificant material left at a crime scene can increase in importance as the trial approaches or during the trial. The skills of the investigator may come into play anywhere or at any time.

The crime scene includes all areas through which the participants moved while entering to commit the crime, while committing the crime, and while exiting the crime

CASE IN POINT

Searching an Outdoor Crime Scene

In a search for a semiautomatic pistol in a man-made lake in Texas, divers laid down a tarpaulin and began unloading and stacking their air tanks, search ropes, personal flotation devices, wetsuits, and other dive-related equipment. Before they found the gun, divers using underwater metal detectors discovered four live 9-mm cartridges. The cartridges were located, bagged, and tagged. By the end of the day, the handgun was discovered and appropriately processed. As the dive team members were stowing their equipment, they discovered three *more* cartridges under the tarpaulin. That team learned that areas adjacent to the crime scene may be a part of that crime scene and must be processed as such.

scene. Generally the crime scene is a single well-defined area, but it may encompass several noncontiguous areas. Because most human activity takes place in sheltered places, the majority of crimes occur inside. Buildings and vehicles are the most common crime scenes, and most crime scene processing involves these locations. However, as more and more people seek outdoor recreation, investigators will need to develop the ability to deal with outside crime scenes as well.

The outdoor crime scene and the underwater crime scene require a redefinition of what constitutes a crime scene or secondary crime scene. People must get to wherever they are going outside, and they seldom walk. The roadways they drove, the areas adjacent to a crime scene that facilitate parking, and the pathways leading to and away from an exterior or underwater crime scene may contain evidence of that passage. In underwater recovery operations, dive team members may stage their equipment and seek access to the area to be searched with little consideration that the area over which they are walking is part of a crime scene. They may begin their search activities walking around in hip-deep water, impervious to the fact that what they are walking upon may also be part of the crime scene.

Reconstructing the scene of a crime is accomplished by recording each piece of evidence in relation to permanent non-evidentiary items at the scene. The strategy is the same regardless of the location of the crime scene. Inside or outside, evidence must be recovered with some record of its relationship to the environment from which it was removed. Inability to demonstrate that relationship at the time of trial may prevent the evidence from being admitted.

■ First Response

The investigative team's most valuable investigative tool consists of the officers who arrive first on the scene. Too often these officers are excluded from the investigative "club," treated as underlings, and denied services and training that could increase the chance of investigative success. It is imperative that **first-responding officers** possess an understanding of the investigative process, including a familiarity with and an appreciation for forensic evidence and its location, processing, and handling. A telephone at a crime scene may be the most convenient phone to use, but getting to the phone and picking up the handset may destroy essential evidence. Ambling through the crime scene is preventable through education about the nature of the first-response function.

Protection of the crime scene will reduce crime scene contamination. All crime scenes and all evidence retrieved from a crime scene could technically be considered

contaminated; the goal is not to add to the contamination. Only materials handled in contamination-free laboratories can be said to be truly uncontaminated. The trick is to prevent any untoward or unnecessary contamination from occurring once the scene and its contents come into the possession of the police. Anyone entering a crime scene leaves something; anyone departing a crime scene takes something along. This kind of **transfer** is what prompts forensic scientists to search for minute materials that may have been left at the scene of the crime.

First-responding officers must protect the scene by:

- Conceptualizing the crime scene
- Establishing the boundaries of the crime scene
- Keeping unauthorized personnel and the curious out
- Detaining and separating any eyewitnesses
- Continuing security until properly relieved

While doing this, they must also obtain medical assistance for anyone at the crime scene who is injured.

The most difficult situations to deal with are those involving other agencies and media representatives. Medical examiners, emergency medical personnel, and coroners all have duties to perform. Bodies cannot be released until officials have completed their investigative analysis. Often, there will be someone making a demand for entry who may be upset by being excluded from the scene. It is vital that the police and all persons associated with a crime scene in any capacity be aware of and comply with the written policies and procedures that apply to crime scene security. Media representatives often attempt to gain access and information by invoking the First Amendment (EXHIBIT 3–1) and the people's right to know. Some police officers are only vaguely aware of the amendment and have little understanding of the cases that have established First Amendment limitations. Nowhere does the First Amendment refer to the people's right to know, nor does it refer to extraordinary rights of the press. It simply refers to the abridgment of freedom of the press. The purpose of the First Amendment is to protect the press and the public from a strong central government and the temptation it would have to censor the press. Denial of access to a crime scene does not abridge freedom of the press; journalists are free to write whatever they wish, within the confines of laws that govern the media.

In managing the press, it is important to attempt to maintain a good rapport with all representatives of the media. First responders do not have the responsibility to make any statements to the press. The public information officer should make all statements to the press, and all requests for access or statements should be referred to that officer. Media representatives have no greater right to enter a secured area than any other citizen, nor have they any greater right to information. Under no circumstances are media representatives to be allowed access to a crime scene. All information provided to the press regarding an investigation should be managed through **press pools** and public statements.

EXHIBIT 3–1 The First Amendment to the U.S. Constitution

Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the Government for a redress of grievances.

OFFICER'S NOTEBOOK

Media Checklist

- Do not contact the media unless you are trained and designated as the public information officer (PIO) or you are cleared through the PIO's office.
- Be courteous at all times. An angry press does not serve the interests of law enforcement.
- Bar all media from a crime scene and advise media representatives that an area will be set aside from which all information will be disseminated.
- "No comment" is often the standard refrain of police. It is irritating to the press and should be replaced with a more rapport-building standard, such as "The public information officer will make a statement to all press representatives as soon as the situation allows."
- Avoid all contact with the media off duty as well as on duty, unless specifically charged with that responsibility.
- Unauthorized statements quoted by the press are often claimed by the police to be misquotations or taken out of context; in reality, they are usually accurate, although uttered thoughtlessly or in haste. Think before you speak, and realize that anything you say can be recorded and broadcast.
- If you are the subject of press coverage, do not fall victim to believing the image the press is attempting to portray.

Once the boundaries of the scene have been determined and made secure, evidence must be discovered and collected and the crime reconstructed. Most evidence at a crime scene is vulnerable, and often the most effective evidence is the most easily damaged. **Trace evidence** is extremely fragile and susceptible to contamination. It is usually undetectable by the naked eye and must undergo extensive laboratory procedures before it can be preserved and used later at trial. Items of evidence such as blood, fingerprints, hairs, fibers, footwear, broken glass, paint scrapings, tread marks, footprints, and tool marks are easily destroyed, altered, or contaminated. Only people authorized by written policy to help process the crime scene should be allowed on the scene.

As important as first responders are in securing the usual crime scene, they play an even more significant role in handling witnesses and securing the area in an underwater investigation. They may have to cordon off high-use areas and contact agencies that possess authority over the waterway to reduce boat traffic and to secure the search area. Many jurisdictions treat waterways as an anomaly and believe that there is nothing to process in an underwater crime scene. This attitude sometimes has led to the inadmissibility of important evidence and the acquittal of offenders who otherwise would have been convicted. It does little good to have a properly trained dive team if the investigator in charge sees water recovery as the mere retrieval of items from beneath the water. Just as there is an appropriate protocol to be employed on dry-land investigations, so too there should be a protocol for underwater investigations.

■ Collecting, Handling, and Preserving Evidence

The objective of all criminal investigations is to win convictions, and the key to winning convictions, even when there is a confession or eyewitness testimony, is the quality of the evidence obtained at the crime scene. The evidence is of little value if it has been handled, tagged, or stored improperly. Once each item of evidence has been photographed and included in a crime scene sketch, it must be collected, preserved,

transported, and stored. Improperly collected, preserved, transported, or stored evidence will be inadmissible at trial once the defense discovers any improprieties. (Issues of admissibility are dealt with in another chapter, as are chain of custody and authentication.)

The handling and packaging of evidence is a lengthy subject. Each item of evidence at the scene should be placed in an appropriate container, which should be tagged to identify it and differentiate it from all other evidence taken at the scene as well as all other evidence ever taken anywhere. Commercial evidence tags and labels are available and provide places for entering pertinent information. Once bagged and tagged, the evidence must be transported to the police evidence room. As mentioned in the chapter on chain of custody, every moment of the existence of a piece of evidence must be accounted for once that piece of evidence has been seized. Appropriate documentation will deflect any suggestion that the evidence in question has been misplaced, manipulated, or replaced. It is the evidence custodian's responsibility to ensure that any access to evidence placed in storage is legitimate and documented.

CASE IN POINT

Searching a Complex Crime Scene

On February 28, 1993, near Waco, Texas, four agents from the Treasury Department's Bureau of Alcohol, Tobacco, and Firearms (ATF) were killed and more than 20 agents were wounded when David Koresh and members of a religious cult, the Branch Davidians, ambushed a force of 76 ATF agents while they were attempting to execute a lawful search and arrest warrant. The ensuing standoff lasted 51 days, ending on April 19, 1993, when the compound erupted in flames. The fire destroyed the compound, and more than 70 residents died. The compound was situated on a 77-acre parcel of land and had multifaceted, multistoried buildings of more than 20,000 square feet (Department of the Treasury, Bureau of Alcohol, Tobacco, and Firearms, 1993).

Prior to the operation in March of 1993, the Texas Rangers were asked by the U.S. Attorney's Office to process the Davidian compound crime scene upon successful completion of the raid. The Rangers began by creating a **crime scene processing plan** that included processing the crime scene, collecting evidence, storing and maintaining evidence, and interviewing and interrogating all witnesses and suspects (Texas Department of Public Safety, 1994). This was the first time a federal agency had requested a state agency to investigate the results of federal actions.

In most investigations, the volume of evidence is not a major consideration. Evidence is documented at the crime scene using log sheets, evidence tags, and submission forms. If a crime scene produces thousands of evidentiary items, however, the process poses a greater challenge. The Waco compound produced more than 300 weapons and several hundred large items (Texas Department of Public Safety, 1994). The Rangers divided the compound into three basic search areas:

1. The main structure (building) and outbuildings
2. Aerial matters (trajectory, angles, and sources)
3. All other physical areas

The evidence was divided into three crime scene categories:

1. Arson evidence
2. Death evidence
3. All other physical evidence

(continued)

Using aerial photographs, maps, and certified engineers, the Rangers created an elaborate grid system. The vicinity around the main compound building was surveyed and sectioned using crisscross lines and stake markers. Each section was further divided into grids. Each building section perimeter followed natural foundation lineaments or existing wall planes. Each section was assigned an alphabetic designation, and each grid was assigned a numeric designation. A grid within a certain section carried the section alphabetic character as the first letter in the grid designation. For example, section A had several grids, and grid 1 of this section carried the designation A1. This method of designation enabled the investigators to identify clearly the exact location where a specific piece of evidence was found. The evidence item could be pinpointed on grid maps for courtroom purposes. The building area of the compound contained 13 sections and 53 grids. The entire compound was divided into 21 sections.

Seven search teams were created to process the crime scene. The teams consisted of the following personnel: team leader, recorder, laboratory technician, ordnance/firearms specialist, and photographer. It was the team leader's responsibility to manage the overall process and make the necessary decisions. The team leader was also the only team member to handle the evidence.

The job of the recorder was to document all pertinent information gathered by the team. The recorder completed the field note documentation when evidence was located and removed from the grid. The laboratory technician was available to handle proper packaging and identification of the recovered evidence. All technical questions were referred to the technician. The firearms and explosives expert was available to handle all weapons or ordinance discovered by the team. This team member was not actively involved in the search but served as an available resource on an as-needed basis. The photographer's responsibility was to visually document the crime scene and all evidence discovered within it. For each photo, the time, date, location, film type, camera settings, and photo sequence were listed.

One Ranger was charged with the responsibility of processing all arson evidence, and another oversaw the handling of all human remains. Whenever a member of the search group located evidence, the team leader was apprised of its discovery. The team leader examined the evidence and directed the photographer to take the necessary pictures of the item in its natural state. The item was then measured and sketched using the rectangularization method. The baseline reference points were the grid cross lines and natural wall planes. Once the proper documentation was completed, the team leader determined whether the evidence was arson material, firearms evidence, or human remains.

Once sufficient items were gathered for transportation to the evidence collection center, the team leader conveyed the evidence to an evidence custodian. The items of evidence were designated a **batch.** Each batch consisted of from 1 to 20 items, depending on their type and size. Two Rangers were assigned to be evidence custodians. The custodians maintained a large truck into which each batch of evidence was placed. The truck was used to transport the evidence to Waco, where it was stored in a specially constructed vault. The truck made the trip whenever it was full or at the end of the working day. A total of eight persons handled more than 3,000 pieces of evidence with confidence that the chain of custody could be established and communicated effectively in court (Texas Department of Public Safety, 1994).

■ Taking Notes

Note takers should record field notes while they are still under the stimuli that made something seem noteworthy, not at a later time. Field notes constitute the most readily available and reliable record of the crime scene. They do not form a logical flow of events but make up a hodgepodge of information gleaned from numerous perceptions, interviews, and measurements. In large investigations, the task of note taking sometimes seems overwhelming, but the basic principles remain the same (see Officer's Notebook).

Field notes are the building blocks the investigator uses to develop hypotheses and, later, a theory of the crime. Field notes also can stimulate the investigator's memory if and when the case goes to court. They provide the basic information for the official report,

OFFICER'S NOTEBOOK

Elements of Field Notes

The Five Ws and an H

Who

- committed the crime?
- had a motive to commit the crime?
- was the victim?
- saw what happened?
- reported the crime?
- might know something?
- were the first people on the scene?

What

- was the relationship between victim and perpetrator?
- crime was committed?
- was said and by whom?
- evidence might there be?
- evidence has been discovered?
- is missing?
- was left?
- was moved?
- was touched?

Where

- did the crime occur?
- was evidence located?
- are all the witnesses?
- were all the witnesses?
- do witnesses live?
- is the suspect?
- was entry made?
- was exit made?

When

- was the crime committed?
- was the crime reported?
- was evidence discovered?
- did the first responder arrive?
- was the scene secured?
- was the scene released?

Why

- was the crime committed?
- was the victim chosen?
- was the location chosen?
- were the criminal implements chosen?

How

- did the perpetrator gain entry?
- was the crime committed?
- did the perpetrator depart?

(continued)

Important Information

Field notes should also contain the following:

- Identification of time and date (the date and time of assignment to the case; the date and time of arrival on the scene).
- Description of the location (description of the scene upon arrival, including weather, lighting, approaches, and geographic location). Information regarding the location can be useful in establishing lines of sight and the distance of visibility.
- Description of the crime scene (broad overview that narrows to specific noticeable details, such as forced entry, disarranged furniture, bloodstains, blood spatter, and the condition of doors and windows).
- Listing of absent items. What should be at the crime scene but is missing often reveals something about the perpetrator and the nature of the crime. A serial killer might take a souvenir or **trophy** that features prominently in fantasies associated with the killings. Such a souvenir or trophy may be helpful in establishing a profile of the killer and figuring out the **killer's signature** (the pattern associated with his or her killings).
- Description of wounds on the victim. The types and locations of wounds should be recorded. If discoloration is present, its location and color should be included.
- Photograph log. The photographer should keep a separate log of photos; if the investigator takes the pictures, he or she should place an entry in the field notes for each entry. The entry should include a description of the content of the photo; the speed of the film; the shutter speed; the distance from the object photographed; the location and direction from which the photo was taken; and the date, time, and case number or name.
- Videotape log. If the investigator is taking the video, then the following information should be recorded: the type of recorder, the type of film, the type of lens or lenses, and whether artificial light was used.
- Identification of the evidence recovered and its location. All evidence must be geographically and temporally located. It is the investigator's job to record sufficient information to adequately place each piece of evidence. All measurements should be recorded, as well as the identity of the person who discovered the evidence. To identify evidence, the investigator should provide a description of the evidence and note its location, the time discovered, who discovered it, the type of container used to store it, the method of sealing the container, the markings used on tags and evidence, and where the evidence is being kept (maintenance log).

which is the foundation for trial testimony. The official report will contain numerous entries. The investigator will produce an initial report early on in the investigation; as the investigation develops and new information is discovered, the investigator will add supplemental reports to the original. The compilation of these reports, in conjunction with the field notes, allows the investigator to recollect the investigation in detail and thus form the backbone of the prosecution and the defense.

All courtroom testimony is balanced against the documentation the investigator has accumulated, including his or her field notes. At the time of trial, the investigator may use the field notes to refresh his or her memory, but doing so allows the defense an opportunity to examine the notes and conduct a cross-examination of the witness pertaining to the notes. With that risk in mind, the investigator should put nothing in the notes that he or she would not be willing to share with the defense, the judge, or the jury. An additional caveat: All notes are available to the defense upon request, and the officer testifying is not allowed to remove anything from the notebook. Each notebook

OFFICER'S NOTEBOOK

Field Notes Best Practices

- Write legibly.
- Write complete thoughts.
- Indicate date and time for all entries.
- For each case, create one set of notes in one or more notebooks.
- Share information with other investigators.
- Corroborate all information.
- Not everything is important, but err on the side of recording too much rather than too little.
- Periodically transcribe your notes in type (they make more sense, and patterns emerge more clearly).
- Organize transcriptions into categories, such as persons, places, and things; physical evidence; forensic evidence; and so on.
- Use a matrix to assist in identifying information. Variations in witness statements regarding height, weight, hair color, stature, eye color, and car color or make can be recorded in a matrix to arrive at a range for each of the identifying characteristics, to compute an average, or to discover the most common response.

should therefore contain notes about one investigation only, so that sensitive material from another investigation is not publicized inadvertently.

In some states, there is a rule of procedure that allows the defense to inquire of the witness whether there are any other writings or statements taken or made by the witness that are not included in the official report. An affirmative answer allows the defense to request a recess and an order directing the witness to obtain the documentation and return immediately with it to the courtroom. Even if the witness is not using the notes to refresh his or her memory, the defense may still obtain them if they exist.

Use of Notes

Notes are useful for the following reasons:

1. As the investigation progresses, suspects and witnesses make statements that may seem insignificant at the time but may later prove important. Field notes allow retrieval of those statements.
2. If a witness or suspect makes a statement and later adds information inconsistent with that statement, the notes will assist in impeaching the new statement and may lead to a confession.
3. It is through gathering, correlating, organizing, and comparing information that the crime scene is reconstructed and derivative evidence developed.
4. Notes are important in preparing for interviews of witnesses, interrogation of suspects, and testifying before the court.
5. Attorneys for the state and the defendant will be interested in the time, date, and manner in which evidence and information were gathered and will have a vested interest in the quality and thoroughness of all reports, notes, and entries.

Memory is always suspect and subject to extrapolation and interpolation, the grist of cross-examination. Memory corroborated by reports and notes takes on a believability not possessed by unaided memory.

The Walk-Through

A **walk-through** of the crime scene is conducted to develop a perspective on the nature of the crime, its commission, and the type of evidence that will be expected and searched for. The question of possible unauthorized intrusions may arise. If the scene is not consistent with the investigator's expectations, the investigator should suspect that contamination has occurred. He or she should then interview police at the scene to determine to what extent the scene has been altered by unwitting forays across the area containing the evidence.

During the walk-through, the investigator visually locates evidence or prospective sites for trace evidence. The walk-through will assist the investigator in determining the boundaries of the search, identifying focal points for the search, and discovering important evidentiary items that may need special photographic or forensic attention. Evidence that deteriorates over time or with exposure should be given processing priority. Experts may need to be invited to the scene to interpret bloodstain patterns or to process trace evidence.

The focal points of the walk-through minimally should include the following:

- The point of entry (including the method of entry)
- The point of exit
- The crime route within the premises
- Contact objects (anything touched by the perpetrator or victim)
- Waiting areas (any place the perpetrator may have waited while watching or stalking)
- Any missing objects and areas adjacent to those objects
- Any turf marking (urine or feces left as a calling card)
- Food or drink ingested or left at the scene

Recording the Crime Scene

The crime scene is first recorded through photography or videography or both. The video camera is a popular tool for recording crime scenes. After the walk-through and before anything is touched, examined, or moved, the scene is put on film or tape. The result is a permanent historical record of how the scene appeared at the time of the documentation. Moving anything prior to recording the crime scene is a gross mistake, for a trial court will usually exclude any photograph or videotape that does not reflect the scene as it was found.

Crime Scene Photography

Police departments across the country are coming to realize that pictures make an impression on juries—even in routine incidents. Departments are finding new ways to use photography, both as a tool for investigation and as a means to record data quickly and accurately.

Attention to a few simple rules can make pictures acceptable to most judges.

- **Do not disturb the scene.** Some courts have held that a scene is disturbed by the addition of a measuring scale and label. Leave them out of the first series of pictures. After the scene has been photographed in its original state, a second series of pictures with size references and labels can be taken.

- **Get a complete series of pictures.** It is sometimes difficult to determine what is important and what is not. Shooting the entire crime scene preserves it and allows subsequent examination for what may have been taken or added. Each important object in the scene should appear in at least three pictures: (1) an overview, (2) a mid-range shot, and (3) a close-up. The overview should cover the entire scene to bring out the relationships among the objects. The mid-range shot shows an important object and its immediate surroundings. Finally, each close-up shows detail clearly. All of these pictures are important. A close-up alone does not indicate where the object was located. An overview alone does not bring out all items sharply enough to permit a detailed examination.
- **Record all data.** A picture log will allow you to note all features that need to be considered in the pictures taken. Additionally, each log entry should include information as to camera angle and perspective. A crime scene sketch showing the location of the camera for each picture taken will be an asset when testifying.

Pictures need not be pretty or artistic to supply convincing evidence.

Photographing the Violent Crime Scene

For the purpose of criminal investigative analysis (profiling), it is important to record much more than those areas in which acts of violence took place. Photographs can be instrumental in recording the victim's lifestyle and personality, the topography and socioeconomic conditions surrounding the crime scene, and much more that is important to any investigator or analyst who is unable to visit the crime scene.

When photographing violent crime scenes, the aim should be to maximize useful information that will enable the viewer to understand where and how the crime was committed. The crime scene includes not only the immediate locality where the crime took place, but also adjacent areas where important acts occurred immediately before or after the commission of the crime. Aerial photographs are particularly important in serial rape or murder investigations, because they can geographically link crime scenes together.

Overlapping photographs should be taken of the exterior of the crime scene to show its locale in relation to the rest of the neighborhood. The photographs can be cut and pasted together to create a panoramic view of the scene. Crowds that gather at a crime scene and license plates of vehicles parked in the vicinity also must be photographed, because the killer may still be in the area observing the investigation.

Interior photographs should depict the condition of the room; articles left at the scene; and trace evidence such as cigarette butts, tool marks, and the impressions of shoe prints. In general, articles apparently in use immediately prior to the commission of the crime or that appear to have been disturbed from their customary position should be photographed.

During a rape investigation, the purpose of the photographic record is to record signs of any struggle at the scene of the attack or indications of the victim's effort to resist the attack, such as bruises, torn clothing, and so forth. Bite marks should be photographed using oblique lighting, with and without a measuring device, at the crime scene.

In a rape-homicide investigation, infrared ultraviolet photography of the body may detect latent bite marks, because hemorrhaging can occur in tissue under the skin. The location of foreign hairs and fibers, biological fluids, and stains may also be discovered and photographed.

In cases involving the sexual exploitation of children, every room in a suspect's residence should be photographed, even if no physical evidence is found during the crime scene search. Chances are the suspect has taken pictures of his exploits and concealed this material at another location. Rarely will these photographs be discarded, because they represent a trophy or remembrance of the conquest. When these photographs are recovered, they may be compared with the crime scene photos to prove they were taken in the suspect's dwelling.

In death due to asphyxia as a result of a hanging, doubt sometimes exists as to whether the occurrence is murder, suicide, or an accident. Photographing the original position of the body may help in determining the manner of death. An overview shot of the body and rope should be taken at torso and foot level. Show the height of the body above the ground; a murderer usually tries to raise the body completely, whereas the suicide victim frequently never gets his or her feet off the ground and is sometimes found in a sitting position or half-prone position. Photographs should be made that show the relative position of any object, such as a chair or stool, that appears to have been kicked from under the feet of the deceased.

If done properly, crime scene photography can greatly assist the profiler in developing a psychological and behavioral profile of the offender.

Bloodstain Photography

Videotape can be an excellent medium for documenting bloodstains at a crime scene. If a video camera is available, it is best used after the initial walk-through. This records the evidence before any major alterations have occurred at the scene. Videotape provides a perspective on the crime scene layout that cannot be perceived as easily in photographs and sketches. The value of videotaping blood evidence is that the overall relationship of various blood spatters and patterns can be demonstrated. The videotape can show the relationship of spatters to the various structures at the crime scene. In cases where the suspect may have been injured, the video camera can be used to document any blood trails that may lead away from the scene.

Whether a video camera is available or not, it is absolutely essential that still photographs are taken to document the crime scene and any associated blood evidence. Photographs can demonstrate the same type of things that the videotape does, but crime scene photographs can record close-up details, record objects at any scaled size, and record objects at actual size. These measurements and recordings are more difficult to achieve with videotape.

Infrared film can also be used for documenting bloodstains on dark surfaces. Overview, medium-range, and close-up photographs should be taken of pertinent bloodstains. Scaled photographs (photographs with a ruler next to the evidence) must also be taken of items in cases where size relevance is significant or when direct (one-to-one) comparisons will be made, such as with bloody shoeprints, fingerprints, high-velocity blood spatter patterns, and so forth. A good technique for recording a large area of blood spatter on a light-colored wall is to measure and record the heights of some of the individual blood spatters. The overall pattern on the wall, including a yardstick as a scale, is then photographed with slide film. After the slide is developed, it can be projected onto a blank wall or onto the actual wall many years after the original incident. By using a yardstick, the original blood spatters can be viewed at their actual size and placed in their original positions. Measurements and projections can then be made to determine the spatters' points of origin (Schiro, 2003).

Digital Photography

In a digital world, it is surprising that many crime scenes are still photographed with 35-mm cameras. Part of the reluctance to use digital cameras has to do with the concern that digital images are more easily altered than are images on film. In truth, if the intent is to alter an image, there is sufficient sophistication to alter the image regardless of medium. This can be countered with sworn testimony that the image has not been altered. In criminal cases, the defense may challenge the authenticity of crime scene photos at a motion to suppress or at trial, leaving the matter to the judge or the jury.

Digital images do not raise the first opportunity for the possibility of manipulation; all methods of recording images can be manipulated. If a digital photograph is altered, it can be detected by embedded information, making the possibility of successful manipulation unlikely. When working with digital images it is important to store the original image. On occasion it is necessary to use software to enhance a digital image or to use color contrast to more fully visualize the digital image. The court will resort to the original image if questions of admissibility arise.

The FBI recommends documenting any and all changes to a digital image. Some software used to manipulate digital images provides an integral recording device, documenting each alteration made with the software. These records will prove invaluable in providing enhanced images to the jury. The FBI Scientific Working Group on Imaging Technologies has addressed most of the important issues involving the use of digital photos in law enforcement. They have provided a set of guidelines that should be considered best practices by anyone considering the use of digital imagery in processing a crime scene; these guidelines are available at www.fdiai.org/images/SWGIT guidelines.pdf.

Digital Photographs in Court

All evidence admitted at the time of trial is subject to rules. Those rules may be the federal rules of evidence or state rules of evidence, or local rules promulgated by felony courts. Scientific evidence also may be subjected to a Kelly/Fry hearing to determine the scientific validity of the process or procedure. Rule 101 of the federal rules of evidence is most commonly employed to admit electronic recordings, computer records, computer data or scientific evidence and would also apply to the admission of digital photographs.

The use of digital imagery in courtrooms is becoming more common and acceptable. Computer-generated simulations based on accurate measurements from the crime scene have long been admissible. The same should hold true for digital photographs where testimony substantiates that the image portrays the scene as it was remembered without altheration.

Admissibility of Images

Photographs

The **predicate for admissibility** of photographs is fairly simple. The attorney wishing to enter the photographs will question the witness as follows:

Q: Officer, I now hand you what has been previously marked as State's Exhibit Number 1, and I ask you, do you recognize this photo?

A: Yes.

Q: What does the photo portray?

A: The scene at 47 Cypress Fairway Village on the evening in question.

Q: Is it a fair and accurate representation of the scene as you recall it? [If the witness is the photographer, the final words would be "as you photographed it?"]

A: Yes, it is.

Q: Has it been altered in any way?

A: No.

Such an exchange will lead to the admission of the photograph only if the answers indicate that the photograph accurately represents the unaltered scene.

The defense typically will cross-examine the witness vigorously in an attempt to get an admission that some item in the photo, even a small one, was moved, added, or altered in some fashion. Occasionally a small item loses its size perspective when photographed. Crime scene photographers will often add a ruler or some other device of known size with which to compare the object to establish proper size perspective. If a ruler has been added, the officer, in response to the last question of the evidentiary predicate, would answer: "A ruler has been added to demonstrate size."

All evidence should be photographed in situ before adding anything to establish size perspective. If an injured party or damaged auto has been removed from the crime scene, the officer assisting in the admission of the photo must state that the scene was altered and describe the alteration.

After presenting the predicate of admissibility, the prosecutor offers the exhibit into evidence. An offer of evidence usually begins with the prosecutor tendering the exhibit to the defense for any objections. If the defense objects (note that the likelihood of an objection increases in proportion to the importance of the exhibit to the prosecutor's case), the defense may choose to engage in a voir dire examination of the witness regarding the authenticity of the exhibit. If the judge sustains any defense objection, the prosecutor may be forced to address the objection by laying a further predicate. Having listened to the objection and the discussion pertaining to it, the testifying officer should then have a good idea of what additional predicates need be established. Once the matter of defense objections has been resolved satisfactorily, the judge will accept the exhibit as evidence. The prosecutor may now ask questions to elicit a description of the contents of the photograph and the significance of those contents.

Videotapes

Investigators rely on video recording to document crime scenes visually. The predicate for videotapes is often confused with the predicate for audiotapes. The appropriate predicate for videos combines the audiotape and still photograph predicates:

Q: Was the videotape you have described as State's Exhibit Number 3 prepared on a recording device capable of making an accurate recording?

A: Yes. [No technical data need be supplied, nor must the videographer have a technical understanding of videocassette recording to establish the predicate for admissibility. However, if the witness is a competent video technician, a brief technical description may ensue.]

Q: Who was the operator?

A: I was. [Or the witness would mention the name of the party who shot the video. It is not necessary to have actually filmed the video to be able to prove it up. All that is required is that the testifying officer has viewed the scene prior to the taping, has viewed the tape, and has determined that the film is an accurate reflection of the scene.]

Q: Have you viewed the videotape?

A: Yes.

Q: Has the videotape been altered in any way?

A: No. [Some agencies will record a voice-over account of what is on the screen to increase the viewer's understanding of the video images. If the officer testifying is not the narrator, the narration is hearsay and is probably inadmissible. If the defense objects to the voice-over, the volume can simply be turned all the way down. It may be necessary to testify that the video has been altered by the addition of a soundtrack but that the addition has not altered the video images.]

Q: When was the videotape made?

A: At 10:45 AM on May 7, 2004 [or whatever the correct time and date is].

Q: Do the pictures of the events contained in the videotape fairly and accurately reflect the scene as you recall it?

A: Yes.

Logging Photographs

Crime scene photographs should be taken in a systematic, coordinated sequence, and that sequence should be recorded by photo number and description. Panoramic and general-content shots should be taken and logged first, with more specific, detailed, and close-up shots following.

Generally, the police only get one opportunity to process a crime scene, but subsequent entries in a photo log may be predicated upon probable cause and warrant acquisition. Everything that needs to be done needs to be done correctly and completely the first time. There is no guarantee that any click of the shutter or any single roll of film will render a usable photograph. Multiple shots of all important aspects of the crime scene may save frustration and embarrassment later. Film is relatively cheap compared with a verdict of acquittal.

OFFICER'S NOTEBOOK

Elements of a Photo Log

The **photo log** should be a story that flows from the general to the specific. It should contain the following:

- Information sufficient to identify the photographer, including name, rank, badge number, and agency.
- Identifying information pertaining to all equipment and film used. The details of the equipment may vary from exterior to interior locations, as might the film speed and exposure settings. Any changes should be reflected in the photo log. Weather and ambient light conditions should be described.
- The case number (if one has been assigned) or a geographic location to which the photos can be tied. The date and time of day should also be provided.
- The chronological order in which the photos were taken.
- The disposition of the exposed film (whether the film was sent out for processing or processed in the police lab). If the photographer processed the film, development and printing information should be provided as an addendum to the photo log.

The log itself is not constructed at the crime scene. All the foregoing information will be included in the field notebook of the photographer and transferred onto a photo log sheet. Most agencies use preprinted log sheets divided into categories for ease of recording.

The Crime Scene Sketch

The data upon which the **crime scene sketch** is based are gathered after the scene has been completely processed and photographed but before evidentiary items have been bagged, tagged, and transported. The sketch is a measured drawing showing the location of all important items, landmarks, permanent fixtures, and physical evidence. The investigator is usually responsible for the crime scene sketch, but some agencies have drafting technicians who do the sketching. It is no surprise that a number of software programs are helpful for creating sketches, and computer-assisted drawing (CAD) is used widely as an investigative tool. There is software that can download information from surveying equipment and use it to create a visual representation based on the measurements. However, the majority of crime scene sketches are still drawn by hand and are not to scale.

Everything that is included in the sketch must be located geographically. (Measuring distance from permanent features is one method of doing this.) Eliminate all unnecessary detail from the sketch, and include only items necessary for locating evidence and establishing scene parameters.

Three basic measurement techniques are used for geographically locating evidence: rectangularization, triangulation, and baseline construction. In **rectangularization** (**Figure 3–1**), two right angles are drawn from the item being measured to the two nearest permanent objects (fixed points). The distance between the two fixed points and the same point on the evidence is measured. In **triangulation** (**Figure 3–2**), as the name suggests, three angles are measured: those of a triangle formed by the item of interest and two permanent objects (fixed points). In the **baseline** construction method (**Figure 3–3**), an arbitrary line (the baseline) of some measurable distance is drawn between two fixed points. There will be a unique line that both goes through the item of interest and intersects the baseline at a right angle; the location of the item can be determined by measuring the length of the line segment between the item and the baseline and also measuring the distance from the baseline's intersection with the line segment to one of the two fixed points.

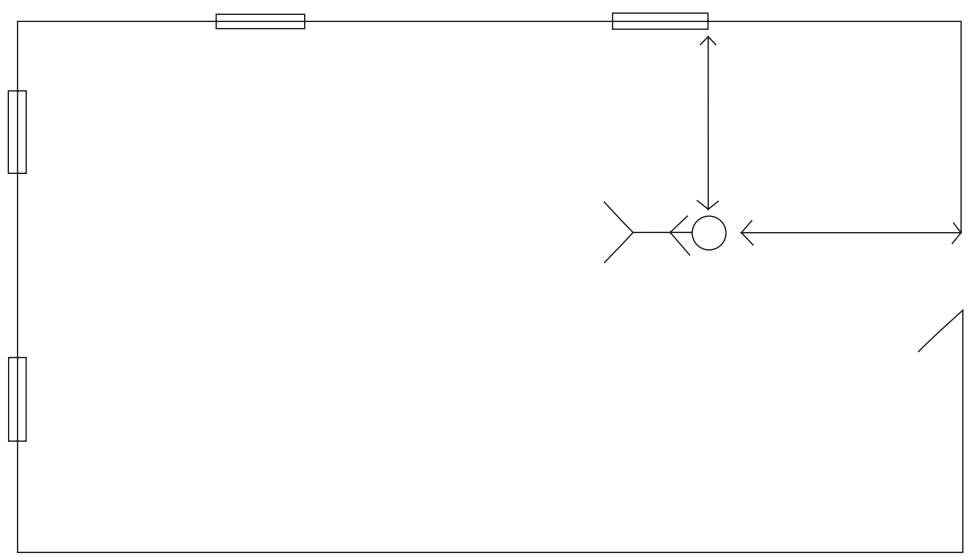

Figure 3–1 Rectangularization.

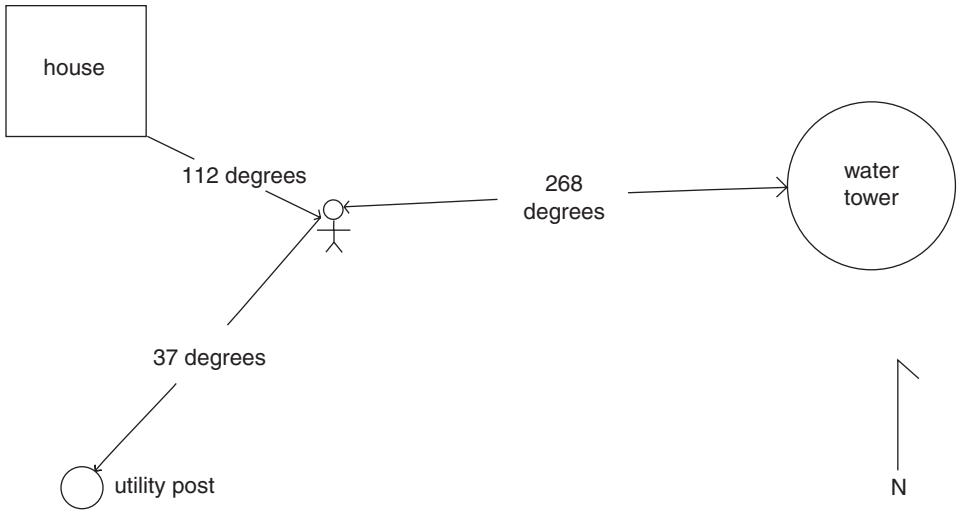

Figure 3–2 Triangulation.

Both triangulation and baseline construction work especially well outdoors, where permanent landmarks are at a distance from the item to be measured, but none of the three methods works very well when processing an underwater crime scene, where measurement of the distance between items in the water and permanent objects in the water is hampered by limited or zero visibility. A method of measurement especially designed for underwater use is discussed in the following section on underwater crime scene searches.

To be useful, a crime scene sketch must contain accurate measurements. Artistic content is not a concern. All measurements should be made from permanent objects. Indoors, walls, doorframes, window frames, and corners serve well as anchors for measurements. Outdoors, buildings, utility poles, roadways, and, less optimally, trees are generally reliable. Keep in mind that anything to which a measurement is anchored must withstand the vagaries of time. The trial may occur years after the offense. The sketch made by an investigator on the scene is not the official crime scene sketch. An initial drawing with measurements is done in pencil and later incorporated into a permanent inked or printed sketch (**Figure 3–4**).

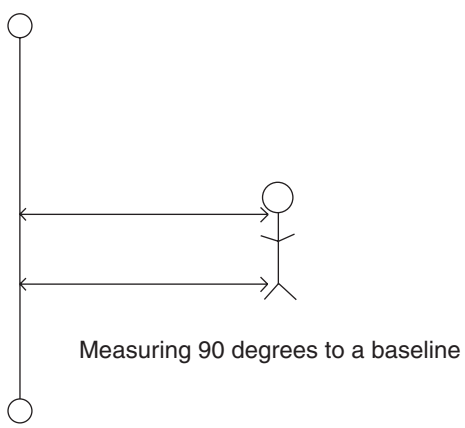

Figure 3–3 Baseline construction.

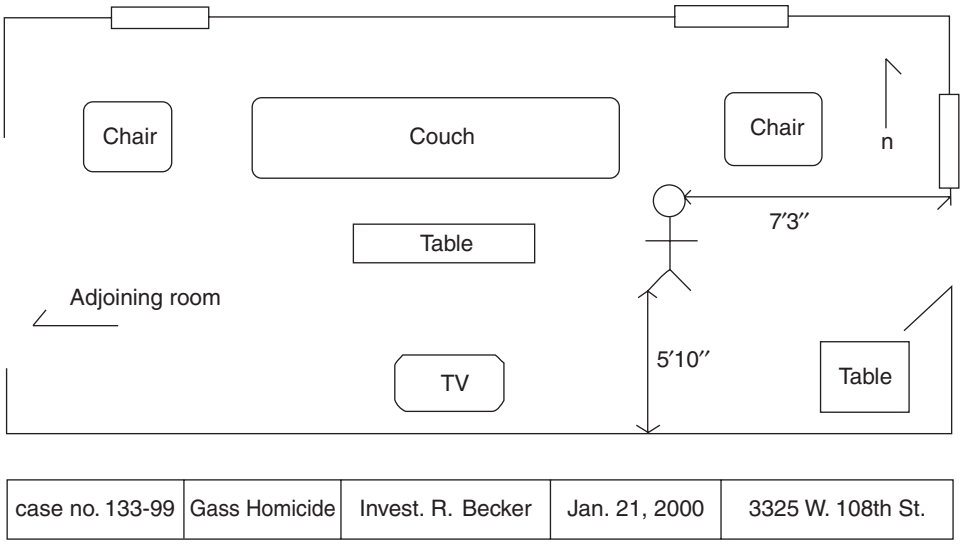

Figure 3–4 Final sketch.

Crime scene templates are available for many different types of crime scenes. Once the crime scene has been measured and those measurements transferred to a sketch, those measurements will be used in reconstructing a more elaborate and architecturally correct diagram. Very little sophistication is required to use these templates but a very professional end product is possible (see **Figure 3–5**).

Virtual Crime Scenes

Crime Scene Virtual Tour (CSVT) provides software and instruction to police agencies to allow them to create admissible demonstrative crime scene tours (**Figure 3–6**). The software provides a distinctive virtual reality approach to crime scene investigation and reconstruction, based on 360-degree panoramic images. CSVT software integrates panoramic crime scenes images, still images, interactive maps, slideshows, texts, audios,

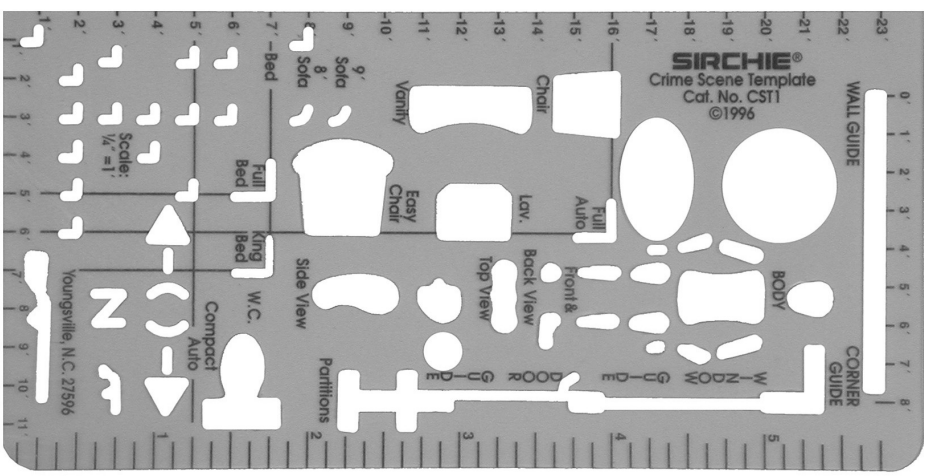

Figure 3–5

Courtesy of SIRCHIE Finger Print Laboratories, Inc.

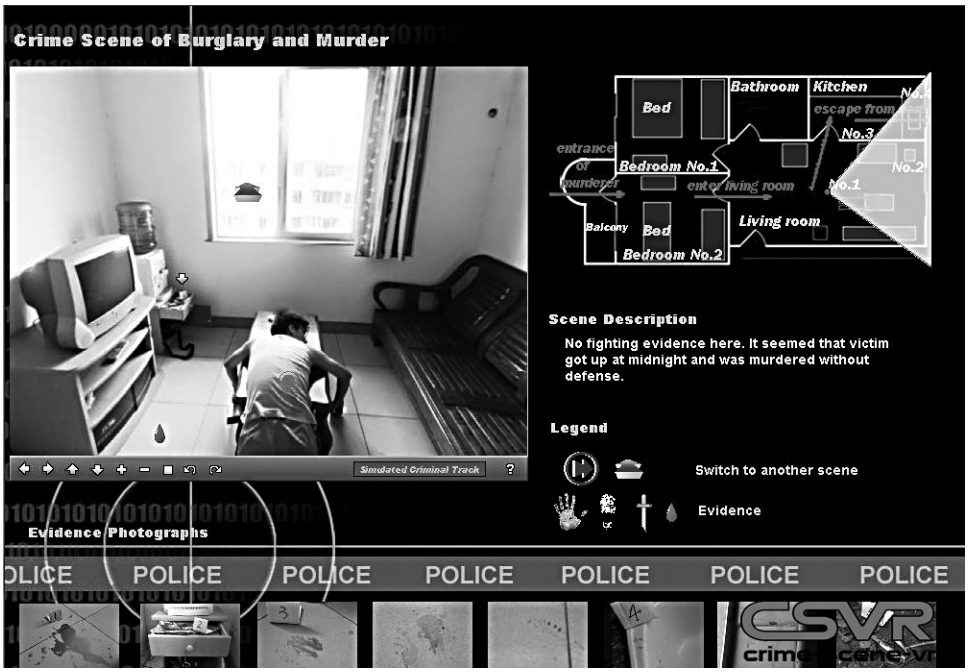

Figure 3–6

Courtesy of Crime Scene VR, www.crime-scence-vr.com

links, and thumbnails into a computer-generated searchable composite. It allows investigators to construct a three-dimensional crime scene that enables the user to wander through the scene.

With conventional photography, dozens of overlapping shots are needed to achieve a 360-degree view; with CSVT, the scene can be viewed from any room or angle, from inside or outside, without losing crime scene continuity. The program allows the user to zoom in, pan, tilt and rotate the scene, as if actually conducting a walk-through. The software allows a crime scene sketch to be added next to images, and then use the synchronized scanning function to roam the sketch while pointing out the same areas on the virtual tour, thereby orienting each piece of evidence. The program offers the opportunity to view images and relevant text at the same time, which saves the time of matching every single film photo to each piece of text. Through the links and thumbnails in crime scene virtual tour, images can be located quickly and easily rather than thumbing through a stack of documents and photos. Crime scene photos are the most common way to preserve a crime scene. Handling, displaying and storing those photos can be difficult. CSVT software provides a useful alternative to conventional crime scene displays and presentation.

A crime scene sketch is of little value if it cannot be admitted at the time of trial. As in the case of photos and tape recordings, there is a particular evidentiary foundation (predicate) that must be established in order to use sketches, maps, or diagrams:

Q: Did you participate in the preparation of the diagram that you have identified as State's Exhibit Number 2?

A: Yes.

OFFICER'S NOTEBOOK

Elements of a Crime Scene Sketch

- A scene identifier. That identifier, placed in the title box, should be either the case number or a recognizable title associated with the offense being investigated.
- Descriptive words identifying where the scene is situated.
- The date of the original sketch (rough sketch).
- The name of the investigator and the person who drew the sketch, even if they are one and the same.
- A written statement indicating the drawing's scale or noting the absence of scale.
- A directional rosette (an arrow showing which direction is north). In orienting the drawing, it is generally presumed that north is up.

Q: Are you personally familiar with the objects and locations contained in the diagram?

A: Yes.

Q: Is this a fair and accurate representation of the [search site, recovery site, location of evidence found] as you recall it?

A: Yes.

Q: Is this diagram drawn to scale?

A: No.

Generally, it is easier to testify about a diagram that is not drawn to scale. Defense lawyers may focus on minuscule measurement errors to try to undermine the credibility of the entire diagram. Reasonable approximations are much easier to defend. However, if all measurements are linked to a permanent landmark that was located on the diagram with the aid of surveying instruments, having a scale drawing may not be a problem.

■ Dry-Land Crime Scene Searches

Control and teamwork constitute the proper foundation for conducting crime scene searches. The importance of teamwork is often overlooked in the zeal of the participants to outdo each other. Each fancies himself or herself a Sherlock Holmes, and there is never a paucity of theories. The value of search teamwork becomes readily apparent when watching a dive team in operation. No one would consider traipsing about helter-skelter looking for whatever presents itself. Because of the medium in which the search is conducted, the search must be organized and methodical. In land searches, because visibility and mobility generally are not limited, organization and methodology are often sacrificed in the name of expedience.

The physical nature of a crime scene will suggest what type of search is best to employ, but the characteristics of the scene should have no effect on the quality of the search. Obviously, there will be exceptions. Large-area searches in mass-disaster investigations may have to sacrifice some quality for expedience, but in the average investigation there is no excuse for haphazard searches. Proceed slowly, for evidence not only can be contaminated by being stepped on but can be destroyed easily or overlooked entirely by the unwary. An experienced investigator will have completed the walk-through before beginning the search, and the walk-through must be conducted with trace evidence foremost in the investigator's mind.

Search Methods

The most effective search method is similar to that used by archaeologists in archaeological field digs. The area to be searched is divided into small squares (grids) approximately 1 meter by 1 meter. Each square is further divided into 4 smaller squares (each equal to one quarter of a square meter). The **grid search** begins in the northernmost of the smaller squares and progresses as one would read a book until the 1-square-meter grid has been examined completely. If trace evidence is a possibility, this is the only method that facilitates the systematic vacuuming of an indoor crime scene, with each vacuum bag representing a grid or a part of a grid (**Figures 3–7 and 3–8**). Obviously, although the grid method is thorough and comprehensive, it is very time consuming and is not appropriate for some crime scenes.

Figure 3–7 Evidence vacuum.

Courtesy of SIRCHIE Finger Print Laboratories, Inc.

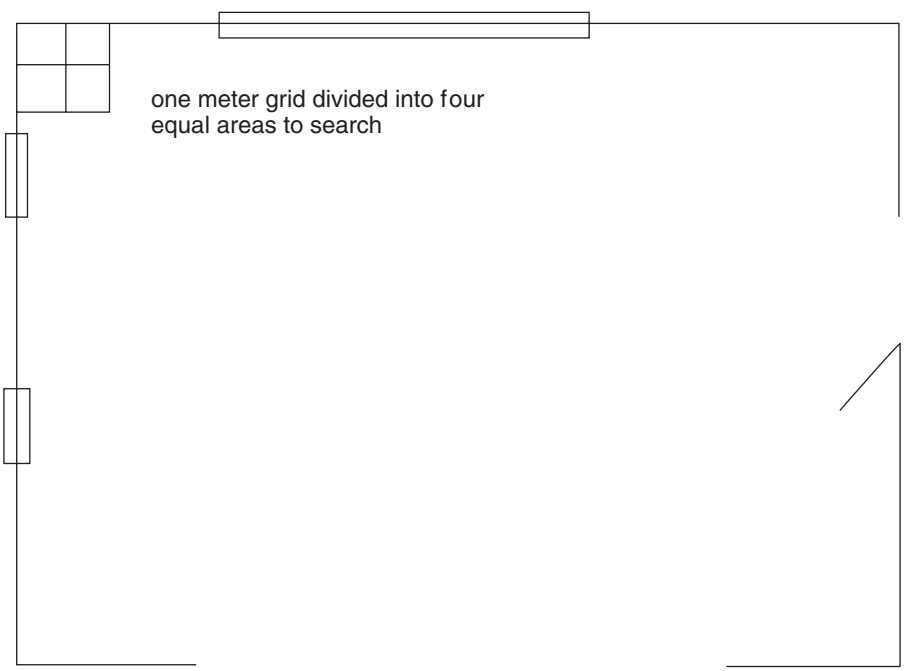

Figure 3–8 Grid search.

One of the more common search methods employed both indoors and outdoors is the **strip search.** The search begins at one corner of a search area and continues to the opposite corner. Upon arrival at the opposite corner, the search reverses, moves 3-feet perpendicular to the line just searched and continues across to the opposite side. This pattern continues at 3-foot intervals until the entire search area has been covered. Of course, furnishings and fixtures may obstruct any search pattern. The search must continue around, over, or through whatever lies in the way.

A **spiral search** also can be used indoors or out. This involves moving in an ever-tightening or ever-expanding spiral, although starting at the outermost point and working inward is preferable. The **sector search** method is appropriate for large crime scenes. It is discussed in the Case in Point regarding the processing of complex crime scenes.

The type of crime committed, the environment in which the crime was committed, and the nature of the evidence anticipated all influence the choice of search method. In some instances, it may be necessary to conduct more than one search or to combine search methods to uncover all evidence sought. Once discovered, physical evidence usually is handled according to a predetermined protocol that includes recording field information about the evidence discovered, often through the use of field notes and evidence tags (**Figure 3–9**). That information may include, but is not limited to, the following:

- The location within the crime scene at which the evidence was obtained
- The name of the person who found the evidence

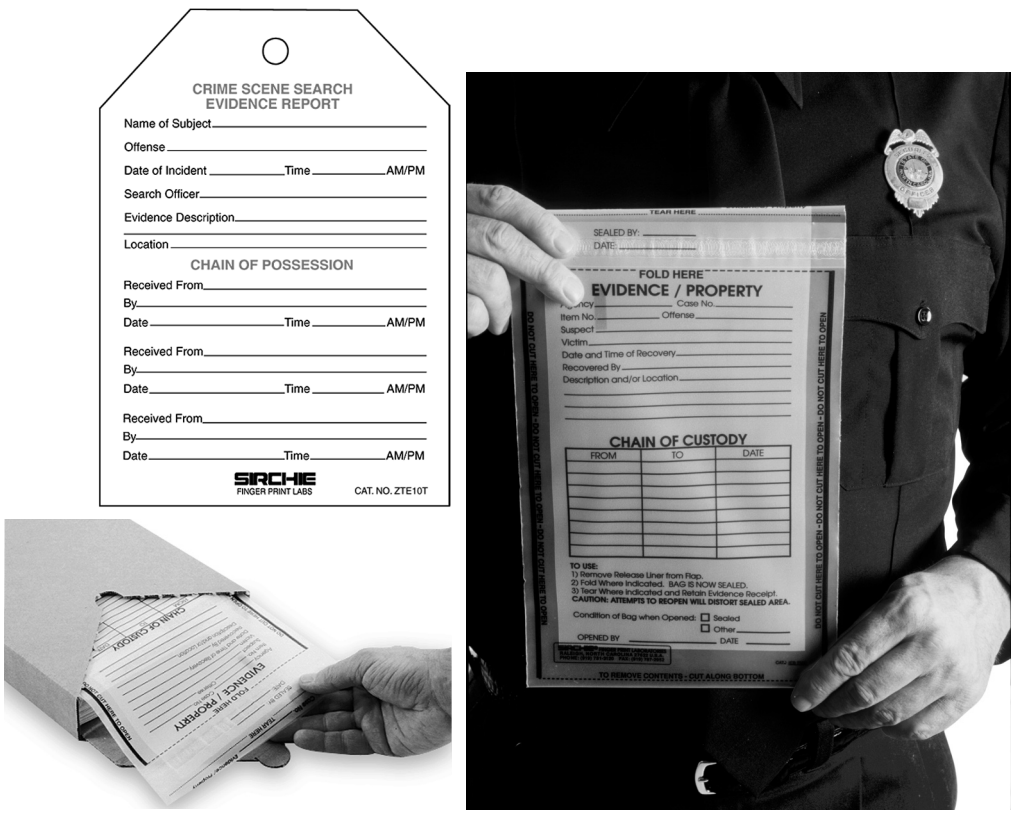

Figure 3–9 Evidence tags and bags.

Courtesy of SIRCHIE Finger Print Laboratories, Inc.

- The time and date of the finding of the evidence
- A description of any interesting characteristics unique to the piece of evidence
- The names of all participants in the search process

World Trade Center

The country changed on September 11, 2001. We lost our naiveté in believing we were immune to terrorist attacks from abroad and changed our focus from domestic terrorism to international terrorism. The lessons learned that day were many and crucial but perhaps most important of those lessons was that there must be a contingency plan in place for a mass terrorist event. Trying to implement one after the event is futile and frustrating.

CASE IN POINT

Large Crime Scenes

Alfred Murrah Federal Building
On April 19, 1995, at 9:03 a.m. CST, calls were received by Emergency Medical Services Authority Oklahoma City. EMS ambulances, police and firefighters had already been dispatched.

The State Emergency Operations Center was set up including personnel from military, civil defense and public safety along with the responding fire and police services. The governor called out the Oklahoma National Guard and members of the Department of Civil Emergency Management. Within the first hour, 50 people were rescued from the Murrah federal building. By the end of the day, over 180 survivors were being treated at hospitals around the city. The last survivor, a 15-year-old girl, was found under the base of the collapsed building.

Three hundred fifty tons of rubble was removed from the site each day until April 29. All of the debris was examined for body parts, explosive residue, and detonators. Canine units searched for survivors and located bodies amongst the building refuse. Rescue and recovery efforts were concluded on May 4, with the bodies of all but 3 victims recovered. For several days after the building's demolition, trucks hauled 800 tons of debris a day away from the site. Some of the debris was used as evidence in the trials of the conspirators.

It is important to understand that the bomb blast to the Murrah building was not devastating by itself—it just so happened that the blast was located at a critical point that undermined the whole structure of the building. Most of the damage and a vast majority of the fatalities were caused by the collapse of the building.

The FBI was on the scene immediately, because the building was under federal jurisdiction. Agents found a truck axle with a vehicle identification number (VIN). It was determined that the explosion had been contained in a 1993 Ford truck owned by Ryder Rentals of Miami, Florida. Ryder Rentals informed the FBI that the truck was assigned to a rental company known as Elliot's Body Shop in Junction City, KS. The FBI interviewed rental agent at Elliot's Body Shop in Junction City on April 19, 1995. The individual who signed the rental agreement provided his name, social security number, South Dakota driver's license, a South Dakota home address, and a destination in Omaha; the FBI's investigation determined all of the information was false.

On April 20, 1995, the rental agent was contacted again and assisted in the creation of a composite drawing. On the same day, agents interviewed three witnesses who were near the scene of the explosion prior to the detonation. The witnesses were shown a copy of the composite drawing and identified him as

(continued)

the person the witnesses had seen in front of the Murrah building. The composite drawing was shown to employees at various motels and commercial establishments in the Junction City, KS, area. Employees of the Dreamland Motel in Junction City told agents that the individual in the composite drawing had been a guest at the motel from April 14 through April 18, 1995. This individual had registered at the motel under the name of Timothy McVeigh, listed his automobile as bearing an OK license plate with an illegible plate number, and provided a home address on North Van Dyke Road in Decker, MI; he drove a car described as a 1970 Mercury.

A check of the Michigan Department of Motor Vehicle records showed a license in the name of Timothy J. McVeigh, date of birth April 23, 1968, with an address of 3616 North Van Dyke Road, Decker, Michigan. Further investigation showed that James Douglas Nichols and his brother Terry Lynn Nichols owned the property at that address and that the property was a working farm.

A relative of James Nichols told the FBI that Timothy McVeigh was a friend of James Nichols, who had been involved in constructing explosives and who possessed large quantities of fuel oil and fertilizer. On April 21, 1995, a former coworker of Timothy McVeigh's reported that he had seen the composite drawing on television and recognized the drawing to be Timothy McVeigh. He told the investigators that McVeigh was known to hold extreme right-wing views, was a military veteran, and was so agitated about the conduct of the federal government in Waco, TX, in 1993, that he personally visited the site.

On April 21, 1995, investigators learned that Timothy McVeigh was arrested at 10:30 a.m. on April 19, 1995, in Perry, OK, for not having a license plate and for possession of a weapon approximately one and a half hours after the explosion at the Alfred P. Murrah Federal Building (**Figure 3–10**). McVeigh, who has been held in custody since his arrest on April 19, 1995, listed his home address as 3616 North Van Dyke Road, Decker, MI, listed James Nichols of Decker, as a reference, and was stopped driving a yellow 1977 Mercury Marquis.

As a result of the investigation conducted by the FBI Timothy McVeigh was indicted, tried, found guilty, sentenced to death, and executed.

FEDERAL COMPLAINT AGAINST TIMOTHY MCVEIGH

IN THE UNITED STATES DISTRICT COURT FOR THE WESTERN DISTRICT OF OKLAHOMA

UNITED STATES OF AMERICA,
Plaintiff

No. M-95-98-H
CRIMINAL COMPLAINT

v.

TIMOTHY JAMES MCVEIGH,
Defendant

I, the undersigned complainant being duly sworn state the following is true and correct to the best of my knowledge and belief. On or about April 19, 1995, in Oklahoma City, Oklahoma County, in the Western District of Oklahoma defendant(s) did, maliciously damage and destroy by means of fire or an explosive, any building, vehicle, and other personal or real property in whole or in part owned, possessed, or used by the United States, any department or agency thereof, in violation of Title 18, United States Code, Section(s) 844(f).

I further state that I am a(n) Special Agent of the Federal Bureau of Investigation and that this complaint is based on the following facts:

See attached Affidavit of Special Agent Henry C. Gibbons, Federal Bureau of Investigation, which is incorporated and made a part hereof by reference.

Figure 3–10

Courtesy of FEMA

(continued)

/s/ Henry C. Gibbons Special Agent Federal Bureau of Investigation

Sworn to before me and subscribed in my presence, on this 21 day of April, 1995, at Oklahoma City, Oklahoma.

RONALD L. HOWLAND
UNITED STATES MAGISTRATE JUDGE

STATE OF OKLAHOMA:
COUNTY OF OKLAHOMA
AFFIDAVIT
I, HENRY C. GIBBONS, being duly sworn, do hereby state that I am an agent with the Federal Bureau of Investigation, having been so employed for 26 years and as such am vested with the authority to investigate violations of federal laws, including Title 18, United States Code, Section 844 (f).

Further, the Affiant states as follows:

1. The following information has been received by the Federal Bureau of Investigation over the period from April 19 through April 21, 1995;

2. On April 19, 1995, a massive explosion detonated outside the Alfred P. Murrah building in Oklahoma City, Oklahoma, at approximately 9:00 a.m.

3. Investigation by Federal agents at the scene of the explosion have determined that the explosive was contained in a 1993 Ford owned by Ryder Rental company.
   a. A vehicle identification number (VIN) was found at the scene of the explosion and determined to be from a part of the truck that contained the explosive.
   b. The VIN was traced to a truck owned by Ryder Rentals of Miami, Florida.
   c. Ryder Rentals informed the FBI that the truck was assigned to a rental company known as Elliot's Body Shop in Junction City, Kansas.

4. The rental agent at Elliot's Body Shop in Junction City, Kansas was interviewed by the FBI on April 19, 1995. The individual who signed the rental agreement provided the following information:
   a. The person who signed the rental agreement identified himself as BOB KLING, SSN: 962-42-9694, South Dakota's driver's license number YF942A6, and provided a home address of 428 Malt Drive, Redfield, South Dakota. The person listed the destination as 428 Maple Drive, Omaha, Nebraska.
   b. Subsequent investigation conducted by the FBI determined all this information to be bogus.

5. On April 20, 1995, the rental agent was recontacted and assisted in the creation of composite drawings. The rental agent has told the FBI that the composite drawings are fair and accurate depictions of the individuals who rented the truck.

6. On April 20, 1995, the FBI interviewed three witnesses who were near the scene of the explosion at Alfred P. Murrah Federal Building prior to the determination of the explosives. The three witnesses were shown a copy of the composite drawing of Unsub #1 and identified him as closely resembling a person the witnesses had seen in front of the Alfred P. Murrah Building where the explosion occurred on April 19, 1995. The witnesses advised the FBI that they observed a person identified as Unsub #1 at approximately 8:40 a.m. on April 19, 1995, when they entered the building. They again observed Unsub #1 at approximately 8:55 a.m., still in front of the 5th Road entrance of the building when they departed just minutes before the explosion.

7. The Alfred P. Murrah building is used by various agencies of the United States, including Agriculture Department, Department of the Army, the Defense Department, Federal Highway Administration, General Accouinting Office, General Services Administration, Social Security Administration, Labor Department, Marine Corps, Small Business Administration, Transportation Department, United States Secret Service, Bureau of Alcohol, Tobacco and Firearms, and Veteran's Administration.

8. The composite drawings were shown to employees at various motels and commercial establishments in the Junction City, Kansas, vicinity. Employees of the Dreamland Motel in Junction City Kansas advised FBI agents that an individual resembling Unsub #1 depicted in the composite drawings had been a guest at the Motel from April 14 through April 18, 1995. This individual had registered at the Motel under the name of Tim McVeigh, listed his automobile as bearing an Oklahoma license plate with an illegible plate number, and provided a Michigan address, on North Van Dyke Road in Decker, Michigan. The individual was seen driving a car described as a Mercury from the 1970's.

9. A check of Michigan Department of motor Vehicle records shows a license in the name of Timothy J. McVeigh, date of birth April 23, 1968, with an address of 3616 North Nan Dyke Road, Decker, Michigan. This Michigan license was renewed by McVeigh on April 8, 1995. McVeigh had a prior license issued in the state of Kansas on March 21, 1990, and surrendered to Michigan in November 1993, with the following address: P.O. Box 2153, Fort Riley, Kansas.

10. Further investigation shows that the property at 3616 North Van Dyke Road, Decker, Michigan, is associated with James Douglas Nichols and his brother Terry Lynn Nichols. The property is a working farm. Terry Nichols formerly resided in Marion, Kansas, which is approximately one hour from Junction City.

11. A relative of James Nichols reports to the FBI that Tim McVeigh is a friend and associate of James Nichols, who has worked and resided at the farm on North Van Dyke Road in Decker, worked and resided at the farm on North Van Dyke Road in Decker, Michigan. This relative further reports that she had heard that James Nichols had been involved in constructing bombs in approximately November 1994, and that he possessed large quantities of fuel oil and fertilizer.

12. On April 21, 1995, a former co-worker of Tim McVeigh's reported to the FBI that he had seen the composite drawing of Unsub #1 on the television and recognized the drawing to be a former co-worker, Tim McVeigh. He further advised that McVeigh was known to hold extreme rightwing views, was a military veteran, and was particularly agitated about the conduct of the federal government in Waco, Texas, in 1993. In fact, the co-worker further reports that McVeigh had been so agitated about the deaths of the Branch Dividians in Waco, Texas, on April 19, 1993, that he personally visited the site. After visiting the site, McVeigh expressed extreme anger at the federal government and advised that the Government should never had done what it did. He further advised that the last known address he had for McVeigh is 1711 Stockton Hill Road, #206, Kingman, Arizona.

13 On April 21, 1994, investigators learned that a Timothy McVeigh was arrested at 10:30 a.m. on April 19, 1995, in Perry, Oklahoma, for not having a license tag and for possession of a weapon approximately 1-1/2 hours after the detonation of the explosive device at the Alfred P. Murrah Federal Building in Oklahoma City, Oklahoma. Perry, Oklahoma, is approximately a 1-1/2 hour drive from Oklahoma City, Oklahoma. McVeigh, who has been held in custody since his arrest on April 19, 1995, listed his home address as 3616 North Van Dyke Road, Decker, Michigan. He listed James Nichols of Decker, Michigan, as a reference. McVeigh was stopped driving a yellow 1977 Mercury Marquis.

(continued)

14. The detonation of the explosive in front of the Alfred P. Murrah Federal Building constitutes a violation of 18 U.S.C. Section 844(f), which makes it a crime to maliciously damage or destroy by means of an explosive any building or real property, in whole or in part owned, possessed or used by the United States, or any department or agency thereof.

Further, your affiant sayeth not.
/s/HENRY C. GIBBONS

Special Agent
Federal Bureau of Investigation

Suscribed and sworn to before me this 21 day of April 1995.
/s/ Ronald J. Howland
UNITED STATES MAGISTRATE JUDGE
Western District of Oklahoma

There are generally five aspects to responding to terrorism that need be considered:

- Prevention—gathering intelligence, wiretaping, surveillance
- Preparation—training, exercises, exams
- Containment—first response, haz mat, police, fire
- Investigation—federal, state, local, ICS (incident command structure)
- Rehabilitation—picking up the pieces, psychological debriefing, putting what is broke back together or back on line

The key to prevention is intelligence in all it forms:

- Human
- Signal
- Systems

The keys to preparation are training, interagency agreements, and contingency plans. The keys to containment are vulnerability analysis and first response training, equipment and commitment, and the key to investigation is recognizing that large crime scenes are most easily processed when viewed as a series of linked small crime scenes. Most of us watched as the attack on this country took place and as the buildings' infrastructures began to deteriorate (**Figure 3–11**). We watched as the debris was searched and bodies removed, although the investigative portion of the endeavor was not televised. Trucks crossed the Verrazano Narrows Bridge, turned off Route 440 and chugged up the incline to the Fresh Kills landfill on Staten Island, NY. Behind tight security, 800 workers from city police and fire departments, the FBI, Secret Service, Bureau of Alcohol, Tobacco and Firearms, National Guard and outside volunteers worked 12-hour shifts; the 45,000 tons of debris yielded 256 body parts, many personal belongings, and aircraft parts.

Figure 3–11

Courtesy of NOAA

Underwater Crime Scene Searches

In February 1994, Southwest Texas State University (now Texas State University San Marcos) purchased what had been Aquarena Springs theme park. The area that had been used for an underwater theater was left intact and unused. Various faculty at the university began to consider possible uses for the park and the theater.

The criminal justice department at Southwest Texas State University entered the world of public safety diver training in July 1994, with the birth of the Underwater

Institute. The author created and was the director of the Institute. In creating a public safety diver training institute it was necessary to determine the state of public safety diving in Texas. It was noted that dive recovery operations were actually "salvage" operations conducted with little regard for an investigatory protocol or the possibility of the existence of forensic evidence. As the training curriculum and underwater research for the Underwater Institute began to take shape, it became apparent that there were some misconceptions—or myths—involved in the processing of submerged evidence. It was to these misconceptions that the Underwater Institute began to devote its attention and course instruction.

The concept of the underwater recovery of evidence as nothing more than a salvage operation represented a major myth that continued to surround the police underwater recovery operation. Agencies also cling to other myths, or misconceptions, about the underwater recovery of evidence. These include the ultimate objective and composition of the dive recovery team, the forensic value of submerged evidence, the assumptions concerning accidents, and the ability to locate submerged items geographically

Myth 1: The dive recovery team's ultimate objective is to recover a submerged item. If agencies continue to view this process as a salvage operation, then they will conclude that the ultimate objective of dive teams is to find and recover the item sought and return it safely. Both represent admirable objectives but remain shortsighted and a product of traditional law enforcement policy, practice, and perspective. However, convicting criminals of the unlawful acts they commit (simplistic but fundamental to scientific processing of an underwater crime scene) represents the true objective of a dive recovery team.

Myth 2: The dive team is made up of a primary diver, safety diver, line tender, on-scene commander, and others involved solely in the recovery process. Embracing the former myth gives rise to this one. However, when agencies recognize that winning convictions constitutes the primary objective of dive recovery teams, they realize that first responders, investigators, crime laboratory personnel, and prosecutors are dive recovery team players as well. First-responding officers set the tenor of underwater investigations, just as they do in land-based operations. These officers have the responsibility of ensuring crime scene integrity and witness identification, segregation, and initial interviews; barring access by all unauthorized personnel, including the media, medical personnel, and curious bystanders; and recognizing the potential location of all forensic evidence, including routes of entry and exit, and protecting these sites. Because these officers play a pivotal role in underwater investigations, agencies should train them in the fundamentals of processing an underwater crime scene, including exactly what they must protect, and provide them with descriptions of other team members' roles. Often, investigators, crime laboratory personnel, and prosecutors also lack an understanding of the scientific approach to processing an underwater crime scene. For example, if only divers realize that submerged evidence has as much forensic value as evidence found on land, then investigators may fail to understand the crucial steps that divers must take to preserve not only the items recovered but the need to collect water and samples of the bottom and surrounding areas as a control for laboratory analysis. Applying the concept of background contamination to underwater evidence collection demonstrates how bottom samples can allow laboratory personnel to exclude the background as the source from which any trace evidence might have originated.

Myth 3: All submerged evidence is bereft of forensic value. Often, water serves as a preservative for forensic evidence that becomes lost only as a result of the recovery

method employed, that is, salvaging. For example, in the true account of a modern murder mystery, a serologist determined that a blood specimen that was submerged for three years in salt water was human blood (Bugliosi, 1992). Also, investigators found fiber evidence on the body of a murder victim even though the perpetrator had disposed of the body in a river (Deadman, 1984). Therefore, while most submerged evidence possesses potential forensic value, all too often, investigators unknowingly overlook, contaminate, or destroy this evidence during the recovery process.

Myth 4: All submerged firearms are bereft of forensic value. Firearms constitute the most neglected evidentiary item recovered from water. A variety of places exist on a firearm that may retain forensic material. For example, fingerprints often remain on protected surfaces, especially on lubricated areas, such as the magazine of a semiautomatic pistol or the shell casing of the rounds in the magazine from the individual's thumb that pushed it into the magazine. Using small-particle reagent, it is possible to recover wet fingerprints without the necessity of air drying first. Also, if the perpetrator carried the weapon in a pocket, under an automobile seat, or in a glove compartment, the firearm could retain a variety of fibers on its sharp edges, especially on sights and magazine levers. Finally, weapons used in contact wounds may have "barrel blowback" (e.g., blood, tissue, bone, hair, or fabric) stored in the barrel of the firearm (Spitz, 1993). When deposited in water, a weapon primarily fills through the barrel. The water serves as a block for any material deposited inside the barrel. The material resides there until a pressure differential (i.e., raising it to the surface) releases the water in the barrel. Unfortunately, such critical evidence frequently is lost due to traditional recovery methods, expedience, and ignorance. If divers hold recovered firearms by the barrel and raise them over their heads as they surface, they drain the contents of the weapons and lose potentially crucial evidence. To avoid this, divers should package weapons in water, while in the water, and obtain a bottom sample to ensure that any fibers or other material found on the weapons are not the product of immersion.

Myth 5: Submerged vehicles are simply stolen. To resolve this myth, investigators should consider two questions. Are all stolen vehicles immediately reported as stolen?

Are all crime vehicles immediately reported as having been used in a crime? Most investigators realize that they should consider all stolen submerged vehicles as crime vehicles (i.e., stolen for use in the commission of another crime) until proven otherwise. In doing so, they can understand that the conventional recovery method (towing by the axle) seriously alters, contaminates, or destroys any evidence. What should they do instead?

Before instituting the recovery of a submerged vehicle, investigators should catalog any information that may become important later but that the recovery method may alter or destroy. Divers can conduct this cataloging process by compiling a *swim-around checklist*. Divers can complete this checklist even in the worst water conditions through touch alone or other means, such as recording the VIN and license number by using a water bath. By pressing a clear plastic bag filled with water against the license plate and their masks to the other side, divers get a clear medium through which they can see the information; a camera can take a picture using the same process. The swim-around checklist allows divers to record the location of any occupants of the vehicle; the condition of the windshield, windows, headlights, and taillights; and the contents of the glove compartment. It also helps divers determine if the keys were in the ignition and if the accelerator was blocked. This information can prove essential during the subsequent

investigation of the incident. Lifting should be done using air bags as opposed to tow trucks, thereby preserving the internal integrity of the vehicle.

Myth 6: All drownings are accidents. Experienced homicide investigators generally presume that all unattended deaths are murders until proven otherwise, except when they occur in the water. Many investigators have participated in the recovery of a presumed accidental drowning victim only to have some serious subsequent misgivings as to the mechanism of death. Therefore, investigators should employ the same investigatory protocol afforded deaths on land to deaths on or in the water. By processing the bodies of drowning victims correctly, investigators can obtain a variety of forensic evidence. For example, divers should place bodies in body bags to avoid losing transient evidence, such as hair or fibers, and to ensure that any injuries that occur during the recovery process are not mistaken for wounds inflicted before death. Bagging bodies in the water reveals damage to the body bags that corresponds to injuries to the bodies that may occur during the recovery process. Bagging bodies in the water also keeps the clothing intact. For example, shoes can contain dirt, blood, glass gravel, or other debris from a prior crime scene, which may prove valuable to investigators and laboratory personnel. Because shoes become lost easily, divers should bag feet, with the shoes intact, to prevent loss and possible contamination during the recovery operation or subsequent transportation of the body to the medical examiner's office.

Myth 7: All air disasters are accidents. This myth coexists with another one: Air crash disasters happen somewhere else. Since September 11, 2001 this particular myth takes on poignancy heretofore absent in America's collective unconscious. Aircraft crashes can and do occur in every part of the world. Moreover, because most of the world is covered in water, many aircraft crashes occur in the water. For every large commercial airliner that crashes into water (or on land), several hundred airplanes with a seating capacity of less than 10 crash into oceans, lakes, and rivers (Teather, 1994). With this in mind, jurisdictions with any type of body of water within its boundaries can recognize that they may have to conduct an underwater recovery of an aircraft. If they assume that such incidents always are accidents, they may overlook, contaminate, or destroy critical evidence that may indicate that the crash resulted from criminal intervention. Investigators also must understand the purpose of the recovery operation in aircraft crashes. To identify passengers and to determine what caused the crash constitute the two primary purposes. However, investigators must remember that when an aircraft crashes, even in water, it generally becomes a mass of twisted, convoluted, and shredded metal, and the occupants usually have sustained massive, often disfiguring, fatal injuries (Teather, 1994). Conducting underwater recoveries of such incidents requires the establishment of contingency plans before an aircraft disaster occurs. In addition, divers involved in the underwater recovery of aircraft and the victims involved in such disasters must have the necessary training and equipment to carry out the operation effectively.

Myth 8: It is not necessary or possible to locate submerged items geographically. This myth has evolved because most underwater recovery operations occur in conditions of limited visibility. However, divers can find a 2000-year-old submerged vessel; sketch the area where they found it; recover, label, and measure all of the pieces in relation to each other; reconstruct the vessel on land; and tell by the placement of the cargo in the hold what ports the vessel visited and in what order it visited them (Becker, 2000). The techniques exist if the need does. Situations where dive recovery teams need to employ such techniques could include an accident reconstruction where one vehicle came to

rest in the water. The position of the vehicle would reveal the direction of travel as well as the approximate speed on impact. In a weapon recovery, the position of the weapon in the water may determine its relevance. If divers discover a weapon 500 yards from where a witness places the individual disposing of the weapon, some serious questions could arise about the case. Investigators must understand the importance of properly marking and recording the location of the recovery site. Failure to do so may result in the loss of the site, in the event that more than one dive is necessary, and considerable expense in time and effort in relocating the site and the evidence at the site; inability to orient parts of a dismantled motor vehicle, vessel, or airplane, or dismembered body; or evidence subsequently being rendered inadmissible at the time of trial (Becker, 1995).

Myth 9: The only successful recovery operation is one that discovers the evidentiary item sought. This is a relatively recent myth added as the result of the author's experience in serving as a consultant for the Honolulu Police Department during a recovery operation for a pipe that had been used in a homicide. The possibility of trace evidence remaining on the pipe was slim but possible (especially on ragged or threaded ends). The media were present in force, because the number of homicides in Hawaii is small and a search underwater for a murder weapon a major media event. Based on the information provided by the suspect, a search area was selected and a search pattern employed and executed. The pipe was not found. Everyone left disappointed. That disappointment led to the inclusion of this myth. In reality a successful underwater search occurs in one of two ways: (1.) the item sought is found, or (2.) There is sufficient confidence in the team, their equipment, and search integrity that it can be stated unequivocally that the item sought is not there.

The second point allows the focus of the search to shift confidently to a new location.

Myth 10: All underwater operations begin at the water's edge. In considering how crime scenes generally are treated, it should be apparent that whatever is in the water did not materialize there. It had to get there in some fashion. Just as in any dry-land investigation, there are points of access, exit, and staging that must be considered as part of the crime scene. Whoever put the item in the water got there somehow. That somehow is part of the crime scene. This became most apparent in a recovery operation for a firearm: The dive team brought a tarp, laid it on the ground and staged their dive equipment upon it. After the discovery of the pistol, the team packed the dive gear was packed, removed the tarp, and found five expended shell casings underneath. Although it was apparent that they were from the recovered pistol, they had been trod upon to the point that their forensic usefulness was compromised.

A major focus in land investigations is on witnesses. Witnesses are as important to the underwater recovery team as they are to any investigative effort. When dealing with drownings or abandoned evidence where witnesses are available, the dive team should not rely on investigators to gather information pertaining to the **last point seen.** The dive team has the responsibility of independently establishing the last point seen. A thorough examination of possible witnesses by a member of the dive team may provide last-point-seen data overlooked or misinterpreted by the investigating officers. That information may reduce the time and effort expended in the search of the applicable areas.

In lake drownings, the victim often is found on the bottom within a radius from the last point seen equal to the depth of the water. For example, if the victim drowned in 30 feet of water, the body will likely be found on the bottom within a 30-foot radius from

CASE IN POINT

Establishing a Last Point Seen

The effectiveness of developing a last point seen and the futility of not using one was demonstrated when a boat sank in a lake surrounded by a residential community. The first divers on the scene inquired of individuals in the general area in which the boat sank, then cleared the area of all civilians. They searched for five days without success. A second team was later dispatched and began canvassing the houses overlooking the area in question. Using a boat placed on the lake as a reference point, various witnesses placed the point at some distance from that first determined to be the last point seen. The sunken boat was discovered shortly after the new search began. The first divers relied on conjecture fueled by haste instead of using a search strategy that began with interviews based on a floating reference point. Although the second team spent a day seeking and interviewing witnesses, their total time on-site was only two days, and their efforts culminated in success.

the point on the bottom directly below the last point seen topside. In establishing the last point seen, it is often helpful to place a diver or a boat in the water and allow the witness to direct the diver to that point. Each interview should be conducted at approximately the location of the eyewitness at the time of the last sighting.

In moving water, a last point seen becomes the demarcation point for determining body drift. A body sinks at the average of 2 feet per second in moving water. To determine the speed of the current it would be necessary to drop something floatable in the water, follow its unobstructed flow for one minute, then measure the distance. That would give us the number of feet the current is moving in one minute. (For feet per second, divide the feet per minute rate by sixty seconds.) It is necessary to convert the current from minutes to seconds because the sink rate figure is measure in seconds. To be able to use the sink rate and the current speed together, these figures they must be of the same unit, i.e., seconds.

Once we have calculated the current speed in feet per second, using a sink rate of 2 feet per second we are now ready to calculate how far down stream the body may have moved.

$$\frac{\text{Current (ft/min)}}{60} = \text{current speed in ft/sec}$$

$$\text{seconds to sink to bottom} \times \text{current speed} = \text{distance traveled}$$

Thus, if the current is traveling at 180 ft/min and the depth is 20 feet:

$$\text{current speed: } \frac{180}{60} = 3 \text{ ft/sec}$$

$$\text{sink rate: 2 ft/sec, i.e., 10 seconds to sink to bottom}$$

$$\text{distance traveled: 10 sec} \times \text{3 ft/sec} = \text{30 ft}$$

All information gathered from witnesses or other investigators is geared to assist in the recovery of physical evidence. Witnesses possess different perspectives, and each witness's perspective may color the information given. Any information provided by investigators pertaining to the search area should be corroborated if possible.

Although the recovery of drowning victims gets the most media exposure, underwater recovery teams spend much of their time in the water seeking evidence, usually in the form of a weapon, stolen property, or abandoned drugs. As waterway recreation and transportation expand, so will crimes committed on the waterways. Underwater

investigators work on a broad range of crimes and crises, including but not limited to boat arson, suicides, homicides, drownings, abandoned contraband, abandoned weapons, abandoned vehicles, vehicle entombment, vessel and aircraft crashes, and attachment of contraband to keels.

The first step in any underwater investigation is to locate the underwater crime scene. It is helpful to think of the recovery of underwater evidence as an extension of the overall investigation.Underwater investigation should be conducted just as meticulously as investigations on land.

As in any investigation, a search cannot begin until a reasonable search area has been delineated and all information that might reduce the size of the search area has been gathered and considered. Much frustration and wasted underwater searching can be avoided by not entering the water too soon. In most cases requiring police divers, the life of the victim is not in question. Bad weather and surface conditions should be considered before anyone is ordered into the water. Barring a hurricane, bottom conditions on one day will be virtually the same the next day. Postponing the dive until better diving conditions are available should always be kept as an option by the team leader. No evidence is so important that it warrants risking the life of a diver.

Divers are often asked to recover an item of evidence that is partially visible or has already been located. When the resting place of the item can be ascertained from the surface, it is not necessary to initiate search procedures. When the recovery team must conduct a search, the following general procedures should be used.

Search Briefing

Once the area of the search has been described, the team leader should conduct a **search briefing.** The briefing should cover the methods to be employed and the role of each participant. The dive team will probably be eager to get into the water, but a lack of planning will likely result in a fruitless initial search, leading to wasted time and a duplication of effort. An integral part of the briefing is documenting the dive (see the Officer's Notebook).

OFFICER'S NOTEBOOK

Elements of the Dive Report

The following information should be obtained and documented for inclusion in the **dive report:**

- Witnesses interviewed (names, addresses, and telephone numbers)
- Dive team members
- Time, date, and location of search
- Persons present
- Purpose of search
- Time divers arrived
- Time search began
- Method of search
- Weather conditions
- Water conditions (temperature, depth, tide, and current)
- Bottom conditions
- Equipment availability (vessels, tow trucks, and barges)
- Time and date of and reason for search termination

Bottom Structure

Determining the **bottom structure** will help in selecting a search method and equipment. Many freshwater sites have silt and mud bottoms. Stirring up sediment can contribute to limited visibility. In searches involving mud and silt bottoms, buoyancy control will be important. Depth will have to be maintained above the bottom at a distance that will allow visual examination of the bottom without stirring up mud. When dealing with a bottom of this nature, the search should be conducted in layers, beginning at the farthest reaches of visibility and descending closer to the bottom in stages. Inland lake bottoms may be covered with decayed vegetation on top of mud or silt, additionally hampering search efforts. Often the only sign of a piece of evidence is the depression or disturbance caused by the item as it settled to the bottom.

Currents

Currents are important for two reasons. First, the diver may need mechanical assistance to maintain a position. Second, police not familiar with underwater operations may exaggerate the effect of the currents when locating the search area. In river searches in which fast currents are evident, it may be necessary to affix a line across the river and anchor it securely on both sides. Once that line is anchored, another line can be tied to it perpendicularly to deploy a rubber raft. Divers can be tended from the raft, and safety divers can be stationed in the raft to facilitate ease of access.

When calculating how far downstream a body may have moved to determine the prospective search area, it is good to bear in mind that the adult human sinks at a rate of approximately 2 feet per second. By determining the speed of the current in feet per second, it is possible to use these two factors to calculate how far the body traveled while sinking before coming to rest on the bottom. Once on the bottom, absent strong currents (in excess of 3 knots), the body is not likely to move.

Surf, Waves, and Tide

Turbulent surface activity in shallow water may affect items lying on the bottom. Again, the effect of surf and waves may not be as great as expected, and search operations should begin at the point of entry. Obviously, tides and crashing surf may move material shoreward or out to sea, but assumptions made as to the degree of movement may be erroneous. The tide characteristics of a potential dive site can affect the search in a number of ways. When investigators interview witnesses about the last point seen, they must take the tide into consideration, because it can influence the witnesses' distance perception. If possible, witnesses should be interviewed at the scene at approximately the same tidal flow as occurred during the incident in question. In areas of significant tidal flux, low tide allows investigators to search the area without needing to enter the water.

Marking the Perimeter

The preliminary briefing should be followed by dispatching divers to mark the perimeter of the area to be searched with buoys and, if necessary, to place a dive flag visible to any vessels that may be using the area. Generally a rectangle is used to describe the perimeter, with each corner marked with buoys that are visible not only to team participants but also to the crews of nearby vessels. These buoys should be large enough not to be ignored.

Once the divers have marked the perimeter, they should locate it geographically (by transit, compass, tape measure, or range finder) and sketch or plot it on a site map. If a site map is drawn or available, plastic overlays can be used to plot the search area

on the overlay without permanently marking the map itself. If the search area must be expanded, the overlay can be replaced. Investigators should keep each overlay as a permanent part of the dive record so that testimony regarding the search can be supported by the plastic overlays. The search area can be expanded by moving two corners of the rectangle designating the original search area, thereby creating a new area to be searched. Once the search area has been marked, the recovery process can begin.

The Underwater Search

It is not always necessary to launch a search using large numbers of divers and expensive equipment. In water of high visibility, for centuries fishermen have used a simple device—a glass-bottom bucket—to locate underwater schools of fish. This same device should be part of every recovery team's equipment. For example, Edmund Scientific of New Jersey makes an inflatable cone with a glass bottom and a viewfinder top designed specifically for clear-water use. Putting police personnel in the water is not always the most effective use of their time.

Search Patterns and Methods

In water of limited visibility or having an irregular bottom structure, divers may search using a search pattern. In **black-water diving,** lines must be sunk to which divers can be tethered while conducting a search by feel, handheld sonar, or metal detector. Handheld sonar can be used in conjunction with any of the search patterns described in this section. A sonar unit emits a beep when it senses an item protruding from the bottom. As the diver descends, the beep becomes louder. Once the diver senses an item, he or she should mark its location with a buoy before the search is interrupted. If the item sensed is not the object sought, the search can be taken up again at the point the item was first sensed. The same approach should be used when the diver is operating a handheld metal detector. Most detectors use dials and audible signals to assist in locating metal. (It would be helpful if sonar and metal-detecting devices also produced a vibration that increases in intensity as the object being sensed draws closer.)

Often, divers conduct low-visibility and no-visibility searches without the assistance of electronic devices. Engaging in a hand search is like crawling through visually impenetrable mud wearing gloves, attempting to identify by touch the things the hand grasps or touches. All the senses focus on the hand and fingers, and the sense of touch heightens to the point that a diver wearing gloves is able to touch a pull tab from a soft drink can and identify it without picking it up. A hand search must be undertaken with diligence and perseverance. A systematic search method will prevent duplication of efforts and will facilitate documentation and in-court testimony.

The offense being investigated will affect the nature and scope of the search, as will existing currents, tidal conditions, water depth, visibility, wind direction, and known bottom structure. It is the recovery team leader's responsibility to determine, based on the relevant variables, which search pattern to employ. Search patterns have different attributes and are able to meet different search requirements, but every search should have certain basic attributes:

- The search should begin at a predetermined point, have predetermined midpoints and changes of direction, and end at a predetermined location or upon discovery of the item sought.
- Surface personnel and searchers should communicate through line signals or be in voice contact.

- The searchers should deploy buoys to mark points of interest or items of evidence.
- The search pattern should be simple.
- The search should use divers and resources effectively.
- The search should allow a large safety margin and provide adequate support for the divers.

Most searches involve a **line tender** (a surface component) and a diver or divers. All divers should be competent in line tending. Working as a team, the diver provides the labor, and the tender provides the direction and support. The tender is the diver's lifeline and is responsible for keeping notes regarding the diver's location, direction, duration, and depth. In cases where a diver is unable to determine air consumption and depth, it will fall to the tender to provide that information. Each tender will need a compass, timepiece, flotation device, and notepad. The compass is for recording search direction and termination points, and the watch is for estimating air consumption and time at depth. A basic rule of thumb based on fatigue and ability to focus suggests that divers should be limited to 20-minute searches. When the call out provides sufficient divers, extended time should be unnecessary. After 20 minutes, air consumption becomes a concern, as do focus and fatigue.

Although a **random search** is no pattern at all, inserting a number of divers at a search site and having them cast about may prove successful if the area is small and visibility is good. In clear water with a bottom layered with sediment, it is important for the divers not to go too deep and agitate the sediment, prohibiting a subsequent patterned search if the random search is unsuccessful.

Sweep searching is the most commonly employed method for searches conducted contiguous to an accessible shoreline, bridge, dock, pier, or in a river whose current requires that a line be stretched across the river. The diver is tethered to the tender by a quarter-inch polypropylene line and swims (crawls) in ever-broadening arcs. The tender line remains taut, and the tender and diver remain in continuous communication through line signals. The farthest reaches of the arcs should be determined by the tender, using landmarks, placed buoys, or compass bearings. The tender should record the terminus of the arcs in his or her notebook and include a sketch of the search site and search pattern.

When the bottom drops quickly, it may be best to employ a parallel pattern to avoid running the diver into the shore and to reduce the number of times the diver's ear must equalize pressure because of a change in depth. Underwater obstacles can be addressed in one of three fashions: by raising the tender line, by conducting the search up to the obstacle and beginning again on the other side of the obstacle, or by placing a flotation device in the middle of the tender line, thereby raising the line off the bottom.

If the area to be searched is relatively free of obstructions and close to the shoreline, a **parallel search** pattern allows lengthy passes along the shoreline, extending outward (**Figure 3–12**). Markers should be placed on the shore at the farthest reaches of the pattern. The tender moves back and forth between these two markers, paralleling the diver. At the furthest reaches of the pattern, two tugs on the tender line communicate to the diver that it is time to turn around and go back the other way, but at a slightly greater distance from the shoreline. The amount of line fed to the diver at each direction change is determined based on visibility. For hand searches, it should be an arm's length.

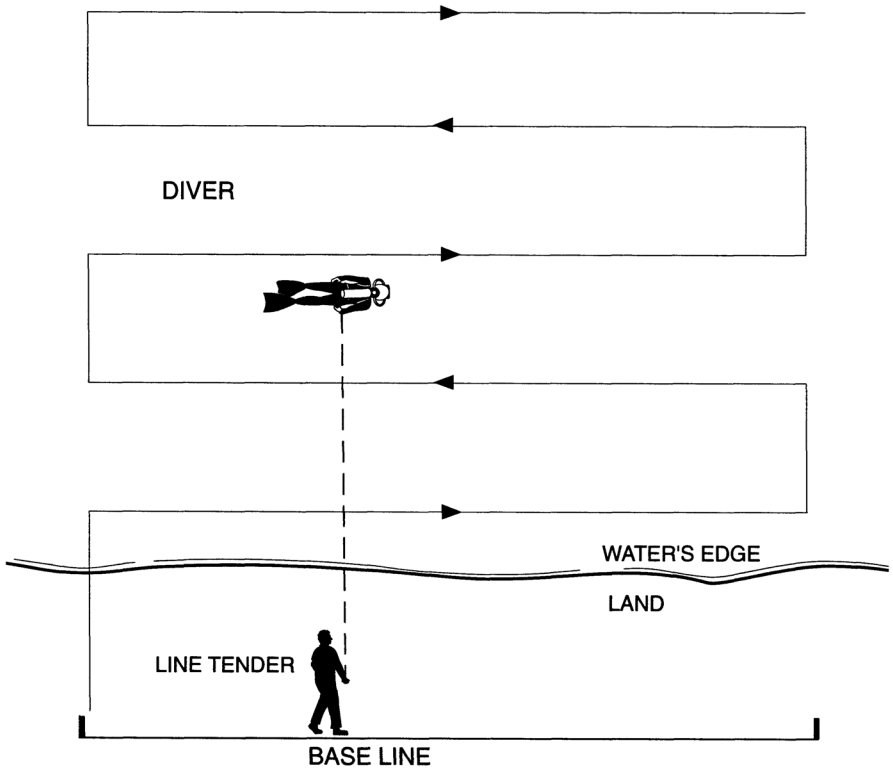

Figure 3–12 Parallel search.

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Circular searches are generally boat-based. They are useful for searching areas in which the line tender is not able to work from shore. In shallow water, the line tender is at the center of the circle in a boat, feeding line to the divers, who swim 360 degrees, then stop and change direction (**Figure 3–13**). At the point where the diver changes direction, the tender feeds additional line. The line tender directs the search using a landmark, an anchored buoy, or a compass bearing to determine when the change of direction should occur. Changing direction is less disorienting than swimming in concentric circles and does not require the tender to continue turning in circles.

In a circular search, the tender can feed the line to the diver using an anchored swivel, or the line can be self-fed. A diver can conduct a circular search without a boat or circle board. A submerged diver, acting as the tender and the center of the search pattern, uses compass bearings or an orientation line to determine the needed directional changes and direct the search.

Snag searching (**Figure 3–14**) can utilize an arc pattern, a parallel pattern, or a circular pattern. The size of the item sought and the number of submerged obstructions determine the applicability of this technique. Its value is that it allows large areas to be searched in a short period of time. The tender allows more line to the diver than would be used in a hand or visual search.

In clear water, a **compass search** can be conducted without a tender. Using compass bearings, divers submerged in the water can direct the course of the search. A compass search works best when there are two divers, one maintaining the compass heading and

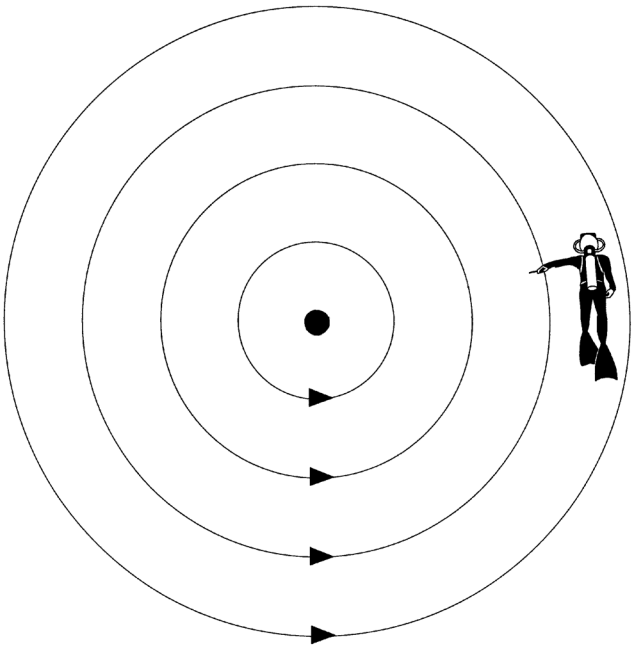

Figure 3–13 Circular search.

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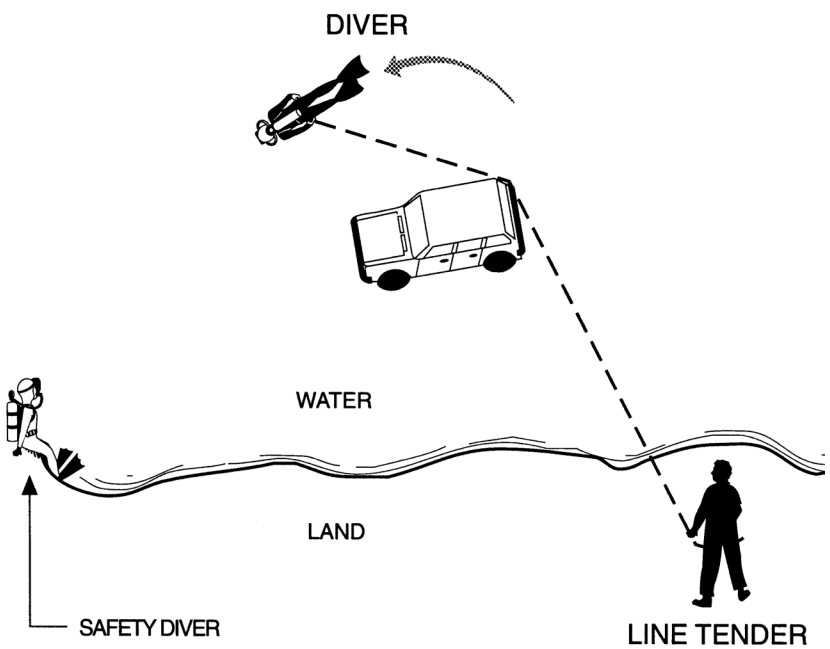

Figure 3–14 Snag search.

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the other conducting a visible investigation of the bottom. Mark the furthest reaches of the search with a buoy so that the next pass is at a consistent distance from the last pass.

Relocating the Search Site

It may be necessary to continue searching a site beyond the first day. In such cases, the accurate plotting of each day's search pattern will prevent duplication of effort or the need to guess where previous searches left off. Once evidence has been found, it may take days to process and recover the evidence completely. Returning to the precise location is essential, but floating buoys left unattended may disappear, so the location should be marked permanently.

If the search party includes a transit operator, the location can be preserved by triangulation. Often divers will attempt to use compass bearings to triangulate their position. Although subject to significant margins of error (depending on the distance of the objects used for triangulation), in many instances compass bearings are all that are available. When a compass is used to locate a site, the objects from which bearings are taken should be greater than 30 degrees apart. When plotted on a map, these bearings should be sufficient to direct the team to the general location. In addition to the compass triangulation, a buoy should be sunk 4 or 5 feet below the surface at the exact spot to facilitate rapid detection of the search site or the evidence being recovered.

An agency with extensive resources might consider acquiring submersible transponders that emit a signal that can be picked up on handheld sonar. Obviously, such a transponder makes relocating a search site simple. Anyone competent in navigation skills should have no trouble in plotting the location of the search site using typical navigational instruments and shoreside landmarks. Numerous commercial **global positioning systems (GPSs)** are available. Although these devices are not as accurate as an instrument stabilized on a tripod and calibrated for accuracy, they are a reasonable addition to the equipment inventory.

Searches conducted out of the sight of land pose an additional problem. Typical navigational techniques, including sextant-based techniques, can only approximate the position of a vessel at sea. Radio beacons affixed to various well-known permanent landmarks allow vessels at sea with radio direction finders (RDFs) to triangulate their positions with a modicum of certainty. Someone with a GPS device can use satellites to compute his or her position to a heretofore unattainable degree of accuracy. Such a device can be used on land or at sea, as long as it is able to receive signals from one of the satellites to which it is calibrated.

The Temporal and Geographic Location of Evidence

After the team has located evidence, the usual next step is to retrieve it. Remember, the officer recovering the evidence will be responsible for testifying as to the method used in locating, marking, sketching, measuring, photographing, bagging, and tagging the evidence and maintaining the chain of custody. A team member must record all details pertaining to the dive site prior to the recovery of any evidence. The boundaries of the recovery site should be marked with buoys and the entire area plotted on a site chart. This chart must be large enough to contain measurement information about each piece of evidence to be recovered. The methods used to record available information will vary depending on the size of the recovery area, nature of the items to be recovered, available time, weather conditions, water conditions, visibility, bottom conditions, seriousness of the offense, and personnel demands.

Failure to mark and record the location of the recovery site properly may result in losing the site (an important setback if more than one dive is necessary), may cause considerable expenditure of time and effort in rediscovering the location, may render the evidence inadmissible at the time of trial, or may make it impossible to orient the parts of a dismembered or dismantled auto, vessel, airplane, or body.

In airplane crashes, body parts—arms, hands, legs, and feet—may be strewn over the site (Wagner and Froede, 1993). Reconstruction of the bodies may require anthropological assistance. Often the fastest way to associate severed limbs with a torso is by recording the location of the body parts relative to the seat or seats to which the parts were closest. By referring to the seating chart, body parts can be associated readily with the passenger who had been occupying the seat nearest to where the body parts were found.

Photography is the most effective method of recording. Where visibility allows, the camera should be the first piece of equipment on the site. The team should photograph all evidence where it is found. After it is measured, sketched, and tagged, the photographer should photograph the evidence again and then bag it.

Measuring Evidence

Trilateration is a method of measurement in which the diver need not rely on sight for accuracy (**Figure 3–15**). Objects in the water are measured from two known locations on the shore. The end of the tape to be read is on shore at the prelocated position, and the diver moves the tape to a point on the object being measured. The shore-based end of the tape is then moved from one known position to the other. It is important to note that this measurement will only give you the location of the object being measured, not its orientation. To orient the object, two more measurements must be taken from a different point on the submerged item.

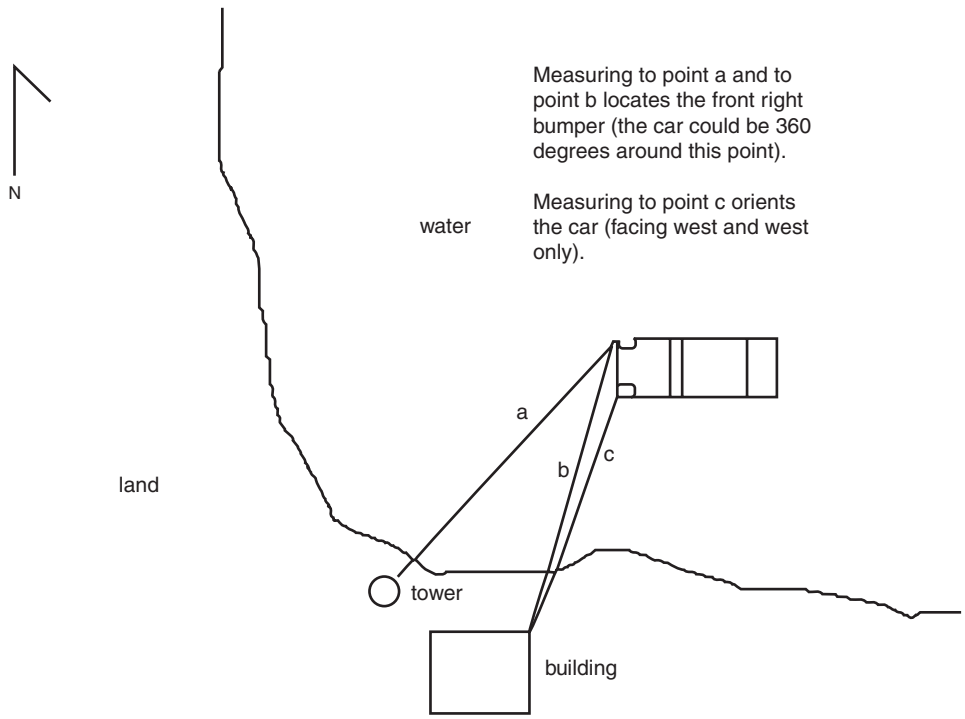

Figure 3–15 Trilateration.

Mass Disasters

Human-made mass disasters are disasters in which human factors are involved. The most common human-made mass disasters are aircraft crashes. Aircraft crashes are especially visible because of the attention accorded them by the media, the great number of airports, the great number of aircraft, and the potential for large numbers of injured and dead. There are an estimated 2000 aviation fatalities nationally each year.

In every aircraft crash, local authorities will be first on the scene. Their conduct will often determine the success or failure of the accident investigation and will play an important role in the successful identification of the dead. The primary objectives are to recover bodies, identify the bodies, and reconstruct the events leading to the crash. The objective of the first-responding team is to secure the scene from any and all trespass. With any exterior crime scene—and air crashes in water are no exception—it is helpful to establish three separate zones of security emanating from the scene center. The zone immediately surrounding the center should not be penetrated by anyone other than forensic specialists with specific authorization, and a ledger should be kept that lists who enters, the time of entry, the time of departure, and what was removed. The second zone should be accessible by only those actively involved in the investigation. The third zone should function as a perimeter from which all traffic approaching the crime scene from any direction can be monitored. The opportunity for looting can be great in a mass disaster.

A mass disaster plan should be developed for each community and each department, including, if necessary, procedures for underwater recovery operations. Specific individuals should be given responsibility and authority to keep all unauthorized people, including unauthorized police personnel, should be kept away from the crash site. The presumption in an airline crash should be that the incident was caused by criminal acts until proven otherwise, and the entire scene should be treated and processed as a crime scene.

On June 24, 1975, Eastern Airlines Flight 66 crashed in New York. Police on the scene gave each body a consecutive number, removed all valuables from the bodies, and put all recovered jewelry and wallets into manila envelopes. The envelopes were then sent to the property room, with the intention being to prevent theft. The bodies were lined up on the tarmac and covered with sheets. All this was done before any efforts were made to use wallet contents, jewelry, or body position to identify the victims. Later, when the personal property envelopes that supposedly contained the personal effects of the passengers were examined, officials found that all valuables had been removed or lost in handling.

Although gathering and inventorying personal effects is important, it is more important not to remove any of these materials until the entire wreck site has been searched and photographed and all remains have been photographed in relation to debris and personal effects. Most underwater investigators use 35-mm cameras and color film. Video footage often reveals a perspective that may be lost in still photography. The entire underwater site should be shot in overlaying strips, the video footage should be overdubbed with narrative, and finally the site should be documented using conventional 35-mm still shots.

The recovery and identification of passengers is generally the most time-consuming part of an air crash investigation, especially if that investigation is taking place underwater. Identification can be positive or presumptive. A **positive identification** is identification beyond reasonable doubt. Positive identification is based on pre- and postmortem comparisons of dental records, fingerprints, palm prints, and footprints or on DNA profiling.

OFFICER'S NOTEBOOK

Aircraft Crash Protocol

In Texas, the Southwest Texas State University Underwater Institute gathered statewide information to provide all jurisdictions with a list of resources in the event of an aircraft crash. The following list is indicative of the type of information necessary to form a contingency plan.

1. Your name and agency affiliation
2. Salvage vessel (describe its size and capacity)
3. Salvage equipment (describe equipment and location)
4. Warehouse (for airplane parts and passenger luggage; describe size, furnishings, and equipment)
5. Refrigerated storage (for bodies and body parts; describe size, furnishings, and equipment)
6. Forensic pathologist (to assist in determining cause of death; provide name and location)
7. Forensic anthropologist (to assist in reassembling body parts; provide name and location)
8. Funeral director (to assist in forwarding or preparing bodies; describe equipment, name, and location)
9. Forensic odontologist (to assist in dental identification; provide name and location)
10. Ambulance service (to transport the injured or body parts)
11. Hospital (to receive the injured and to provide medical and dental records for the deceased)
12. Divers (equipped with gear and training for contaminated and hazardous materials; describe gear and training and provide names of divers)
13. Communication equipment (describe type and number)
14. Mobile housing (to accommodate manpower needs)
15. Psychologist (to provide debriefing for participants)
16. Food service (to feed participants)
17. Sanitation facilities (to meet participants' needs)
18. Shuttle craft (to transport divers and searchers; describe size, power, and capacity)
19. Any other equipment or services that might assist in the response to an in-water air crash

A **presumptive identification** is an identification that is less than certain. A presumptive identification requires several points of inconclusive comparison that cumulatively establish the legal identity of the body.

The easiest way to begin an underwater air crash investigation is to obtain a passenger list and seating assignment. The investigation is likely to be hampered by the fact that many of the bodies will have been torn asunder, disfigured, or mutilated as a result of impact or deceleration. A group of body parts and personal possessions may be near an assigned seat, giving some clue as to their identity. It may take time to obtain the information necessary to begin identification, such as the flight manifest, the seating assignment, medical and dental records, and information provided by family members and employers. In most cases, positive identifications are made on the basis of comparison of teeth and dental records. Few people today have not had dental work done on their teeth. That dental work is as individual as fingerprints.

Fingerprint comparison is the next most common method of identification. It has been estimated that only 25% of the American population have fingerprints on file. Only a single fingerprint is necessary to confirm identification.

If body fragmentation is extensive, identification becomes more difficult. For presumptive purposes, a single finger, foot, part of a dental prosthesis, or jaw can identify a passenger as having died in the crash. There are 206 bones in the body, and any one of

EXHIBIT 3–2 Do's and Don'ts for Dealing with the Media

Do	*Don't*
Be firm	Be unnecessarily gruff
Be specific	Be pedantic
Be courteous	Make any on-record statements
Designate press pool area	Apologize or make exceptions
Escort media representatives from the crime scene	Enjoy it
Advise media representatives of press releases	Make press releases
Encourage coverage	Assist in coverage
Recognize First Amendment rights	Allow photos to be taken
Encourage investigative reporting	Allow access to witnesses
Keep lines of movement open	Take no for an answer
Keep lines of communication open	Allow media to be obstructive

them may have specific characteristics that will allow identification when compared with antemortem X-rays. Such identification will allow a death certificate to be issued. An unidentified individual hampers the investigation and places the burden of an unsettled estate upon the next of kin.

In all crashes, the specter of a human-caused explosion hovers. All clothing, personal effects, and body parts should be handled in the same fashion as for a known bombing. Any investigation should search for detonator components. Aircraft parts should be recovered and documented like any other evidence. Even in the case of a crash where there is confirmation of accidental causes, those causes will be best discovered and corroborated by treating the recovery operation as a criminal investigation.

Investigators of an air crash are subject to pressures to move quickly to determine the cause and forestall the clamor of relatives trying to determine if their loved ones were passengers. Those pressures should not affect the quality of the investigation. An underwater recovery is an especially time-consuming operation, and the public, media, and federal agencies must learn to accept that. It is akin to an underwater archaeological excavation and brings into play the full range of underwater skills used in recovering, measuring, and processing evidence. Further, time, diligence, and patience—the main requisites of an underwater excavation—are anathema to the public and the media. Fortunately, once the human remains have been recovered, there is little reason to hurry the investigation of an air crash. (See EXHIBIT 3–2 for guidelines for dealing with the media.)

OFFICER'S NOTEBOOK

On-Scene Conduct

- Keep the search scene secure and organized, and anticipate attempts at covert photography.
- All briefings and debriefings of dive team members should be done in private.
- Recovery team members should arrive at the site together rather than straggle in individually.
- Conduct and conversation should reflect the gravity of the situation at all times.
- The release of information pertaining to victims should be done by authorized personnel only.
- All statements to the media should be prepared statements and should be read to media representatives (copies of such statements should be kept as part of the file).

CASE IN POINT

September 11, 2001

The enormity of the World Trade Center crime scene (approximately 16 acres), coupled with the sheer mass of 140 million tons of debris, made the job of recording evidence unearthed during the recovery and clean-up effort extremely difficult (**Figure 3–16**). From the outset, investigators required careful documentation of each piece of evidence as it was uncovered by firefighters and other recovery crew members. The precise location of evidence—which ranged from human remains and building debris to scraps of airliner metal—aided in the reconstruction of the event.

Early on, the process of (1) identifying each piece of evidence and (2) recording its location within the mountain of snarled metal and concrete was conducted manually. Handwritten notes describing each item, coupled with rough measurements or estimates of its location, were made by those clearing and processing the crime scene, along with notes on the date and time of discovery. A tracking number was assigned to each item. Later, these notes were entered into a database. The process was slow and difficult. Mismatched numbers and inaccurate estimates of location inevitably arose under the difficult conditions. Moving around on the debris field seeking points of reference for handheld measurement created the potential for serious on-site accidents among the ruins.

Recognizing the problems, New York Fire Department officials enlisted the help of Links Point (Norwalk, CT), a firm specializing in wireless data-transmission systems that incorporate GPS technology for a range of tracking applications. Links Point's solution included the use of handheld terminals manufactured by Symbol Technologies, Inc. (Holtsville, NY), which contained integrated barcode scanners and customized software from Links Point. The handheld terminals also had built-in radio transceivers for sending information to host computers.

Equipped with this state-of-the-art equipment, the task of recording data immediately became safer and faster, and much more accurate. Using a handheld terminal, a firefighter, when finding evidence,

Figure 3–16 World Trade Center.

Courtesy of Andrea Booher/FEMA Photo News

was able to key in a brief description of the object. A barcode was attached to the object, serving as a unique "serial number," which was later rescanned to retrieve information from a database. Onsite, the firefighters scanned the item's barcode. Simultaneously, its location was recorded by a GPS link, which is accurate to within 3 feet. Additionally, the application software electronically time-stamped the data transaction with the date and hour of the recording.

All this information was instantly uploaded into one of a number of laptops set up as host computers for the evidence-recovery effort. In this way, an accurate database of all items was created, assigning specific locations for each within a large gridwork covering the recovery site.

On the night of September 12, 2001, the Fresh Kills Landfill on Staten Island was designated a secondary crime scene, and trucks began arriving from Ground Zero with steel and crushed debris that was once the World Trade Center. Over the next 10 months, an operation to recover human remains, personal effects, and the objects of everyday life from tons of material was undertaken by the New York Police Department, an FBI evidence recovery team, 25 state and federal agencies, and 14 private contractors. Thousands of detectives, agents, and forensic evidence specialists worked around the clock to recover remnants of the lives lost at the World Trade Center. Over 1.7 million hours were spent working at the landfill. Those 1.7 million hours revealed

- 4,257 human remains, which resulted in the identification of over 300 individuals to date
- Approximately 4,000 personal photographs
- $78,318.47 in domestic and foreign currency
- 54,000 personal items, such as identification cards and driver's licenses
- 1,358 vehicles, including 102 fire apparatus and 61 Police Department vehicles

Salvage techniques occasionally have been used for the rapid recovery of underwater evidence. The public now expects these techniques to be employed in any underwater investigation of an air disaster. It is necessary to help the public understand that a full and complete archaeological recovery operation has important benefits that are worth the extra time needed. Public relations in this type of situation require a masterful touch, but the investigation should involve a complete archaeological examination and excavation of the scene to ensure that no evidence of identification and causation (criminal endeavor) is overlooked. Although a good working relationship with the press is desirable, it is best for recovery team members to leave the establishment of such a relationship to the persons assigned to that task.

Summary

If an investigator can process a homicide, then in all likelihood that same investigator can employ techniques borrowed from a homicide crime scene investigation in processing any other type of crime scene. It is for that reason that homicides were the grist for discussing crime scene processing in this chapter. Much of what we see in the movies deals with the pursuit and apprehension of criminals, not with the day-to-day tedium associated with interviewing witnesses, canvassing neighborhoods and digesting information gleaned from the crime scene. Much of the work of the criminal investigator is dictated by what is left at the crime scene. How the investigator processes that crime scene and handles the evidence found there determines to a large degree the ultimate success of the investigation.

The next chapter deals with legal issues associated with criminal investigations. It is impossible to conduct a competent investigation without having a fundamental

understanding of the law that applies. In the main, what investigators need to know is contained in the Fourth, Fifth and Sixth Amendments and the US Supreme Court cases interpreting those Amendments. The following chapter provides that information.

Key Terms

baseline: Arbitrary line of some measurable distance drawn between two fixed points; also, a construction method used to geographically locate evidence

batch: Group of a defined number of pieces of evidence, used to track and store those items for later use

black-water diving: Diving done to collect evidence in water of limited visibility. In this type of diving, investigators must sink lines to which divers can hold while conducting a search by feel, handheld sonar, or metal detector.

bottom structure: The composition of the floor of an area where divers will search for evidence. Knowing this helps decide what equipment will be needed for the dive

circular search: Boat-based searches that are useful for searching areas in which the line tender is not able to work from shore. In shallow water, the line tender is at the center of the circle in a boat, feeding line to the divers, who swim 360 degrees, then stop and change direction. At the point where the direction is changed, the tender feeds additional line to the divers

compass search: Search done in clear water, in which divers submerged in the water direct the course of the search using compass bearings

contamination: Materials and other factors added to crime scene that were not there at the time of the crime and can affect the proper collection and interpretation of evidence negatively

crime scene processing plan: Plan created to carry out a systematic investigation of a crime scene

crime scene sketch: A measured drawing showing the location of all important items, landmarks, permanent fixtures, and physical evidence at a crime scene

dive report: Report documenting the details of the dive, including the people involved, the reason for the dive, and the conditions during the dive

first-responding officers: First officers to arrive at the crime scene. They are responsible for protecting the crime scene from any avoidable contamination in order to preserve it for investigation purposes

five Ws and an H: Who, what, where, when, why, and how.

global positioning system (GPS): A device that uses satellites to compute position

grid search: Search method in which an area to be searched is divided into small squares approximately 1 meter by 1 meter, each of which is further subdivided into 4 smaller squares. The search begins in the northernmost of the smaller squares and progresses as one would read a book until the 1-square-meter grid has been examined completely.

Kelly/Fry hearing: Hearings to determine the scientific acceptibility of the testimony to be offered.

killer's signature: The pattern associated with a person's killings

last point seen: Last location where a drowning victim was on top of the water; used to locate that person under the water

line tender: The surface component of an underwater search

parallel search: Search pattern done in areas relatively free of obstructions and close to the shoreline; it allows lengthy passes along the shoreline, extending outward

photo log: Recording of the people involved, equipment used, and conditions under which crime scene photographs were taken
positive identification: An identification beyond reasonable doubt
predicate for admissibility: The requirements that need to be met in order to use an item as evidence in a trial
press pool: A group of journalists authorized to cover an event
presumptive identification: An identification that is less than certain and requires several points of inconclusive comparison that cumulatively establish the legal identity of the body
random search: Method used by divers for searching that has no pattern, but which can be useful when a number of divers are placed in a small area with good visibility
rectangularization: Basic measurement technique used for geographically locating evidence, in which two right angles are drawn from the item being measured to the two nearest permanent objects (fixed points), and then the distance between the two fixed points and the same point on the evidence is measured
search briefing: A meeting that takes place once the search area has been described to cover the methods to be employed and the role of each participant in the search
sector search: A search method that is appropriate for large crime scenes
snag search: Search method that can be used with an arc pattern, a parallel pattern, or a circular pattern; it allows large areas to be searched in a short period of time
spiral search: A search method that involves moving in an ever-tightening or ever-expanding spiral; it can be used indoors or out
strip search: Search method that begins at one corner of a search area and continues to the opposite corner. Upon arrival at the opposite corner, the search reverses, moves 3 feet perpendicular to the line just searched, and continues across to the opposite side. This pattern continues until the search is complete
sweep search: The most commonly employed method for underwater searches conducted contiguous to an accessible shoreline, bridge, dock, pier, or in a river whose current requires that a line be stretched across the river. The diver is tethered to the tender by a quarter-inch polypropylene line and swims in ever-broadening arcs
trace evidence: Evidence left at the scene of a crime that usually cannot be seen with the naked eye and that requires the assistance of lights or reagents to visualize
transfer: The process whereby a person entering and exiting a crime scene leaves something and takes something
triangulation: Basic measurement technique used for geographically locating evidence; in this technique, three angles are measured, those of a triangle formed by the item of interest and two permanent objects (fixed points)
trilateration: A method of measurement that does not rely on a diver's sight for accuracy. Objects in the water are measured from two known locations on the shore
trophy: Remembrance or souvenir of a conquest; a body part
walk-through: Passing through a crime scene to survey the scene and determine what type of search method should be employed

Review Questions

1. Why is it important to secure the crime scene?
2. What part of the crime scene is the most difficult to preserve?

3. What is physical evidence?
4. What is meant geographically by the term *crime scene?*
5. What is the importance of the first-responding officer to the investigative team?
6. What is crime scene contamination, and what role does it play in the processing of a crime scene?
7. What is transfer, and what is its significance to a crime scene?
8. What are the eight elements of an appropriately protected crime scene?
9. What rights do the press have to view a crime scene?
10. What is trace evidence, and what precautions must be provided to ensure that such evidence is not destroyed?
11. What are field notes, and what role do they play in the criminal investigation?
12. What are the five Ws and the H of crime scene investigation?
13. What kind of information should be recorded pertaining to recovered evidence?
14. What is a walk-through and what purpose does it serve?
15. Where does photography come into play in processing the crime scene? What is photographed and when is it photographed?
16. What is the appropriate predicate for the admissibility of crime scene photographs?
17. What information is included in a crime scene photo log?
18. What are triangulation, rectangularization, and trilateration?
19. What information should be included on a crime scene sketch?
20. What is the appropriate predicate for the admissibility of a crime scene sketch?
21. Describe three dry-land and three underwater search techniques.
22. How does processing a complex crime scene differ from processing a less complex crime scene?
23. Describe the search plan employed by the Texas Rangers at the Branch Davidian compound near Waco, Texas.
24. In underwater searches for drowned victims, what is the last point seen, what is its significance, and how is it determined?
25. What should the presumption be in a mass disaster?
26. List three rules of crime scene photography.
27. Discuss the type of photographs that should be taken at a crime scene.
28. Why photograph blood stains?
29. How should a violent crime scene be photographed?
30. When should a crime scene be photographed?
31. What problems might arise in using a digital camera to record a crime scene?
32. Of what value are virtual crime scenes to the investigation of a crime?
33. Of what use are templates in creating a crime scene sketch?
34. What was the major factor in the capture of Timothy McVeigh?
35. How far downstream might an adult body travel if the water is travelling 180 ft. per minute with a depth of 20 feet?
36. What is a successful underwater recovery operation?

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