• Briefly record initial observations of the answers to who, what, where, when, and how questions. This is not an appropriate time for a detailed description of the scene.
• Access the scene for personnel, precautions, or equipment that will be needed.
• Notify superior officers or other agencies as required.

3.4 Crime Scene Documentation and Forensic Photography

Once the crime scene has been evaluated by the preliminary scene survey, the crime scene’s condition must be recorded or documented. This is perhaps the single most important task of the crime scene investigator. Given that crime scenes are transitory and begin to change the instant after they are created, it is essential to have a permanent record of the scene as it was before processing. The purpose of crime scene documentation is to permanently record the condition of the crime scene and its physical evidence. It is the most time-consuming activity at the scene and requires the investigator to stay organized and systematic. Problem-solving skills, innovation, and originality will also be needed. The four major tasks of documentation are (1) note taking, (2) videography, (3) photography, and (4) sketching. All four are necessary and none is an adequate substitute for another; for example, notes are not substitutes for photography and video is not a substitute for sketching. Each tool must be applied when and where needed to give as complete a record as possible.

3.4.1 Digital Imaging and Photography

One of the most striking changes in crime scene documentation in the past 20 years is the advent of digital imaging, which has replaced traditional film cameras in all but a very few instances. (See Sidebar 3.2 for more about the history of forensic photography.) Digital image technology provides the crime scene investigator with powerful tools for capturing, analyzing, and storing the record of the crime scene and its physical evidence (Figure 3.2). These digital image tools complement the traditional video and still photography used in crime scene documentation. The advantages of digital images include instant access to the images, easy integration into existing electronic technologies, and no need for the often expensive film processing

SIDEBAR 3.2. HISTORICAL NOTE: THE BEGINNINGS OF FORENSIC PHOTOGRAPHY

Forensic photography came of age during the killings in London attributed to Jack the Ripper (1888). Photographs of victims and the crime scenes became famous and revealed the brutality of the crimes. Europe was the site of much of the pioneering work in forensic photography, including the early use of what are now called mug shots in Switzerland in the mid-1850s. The growing importance of forensic photography was instrumental in the founding of the Lausanne Institute of Police Science in Lausanne, Switzerland, in 1902. This institute remains a hub of forensic science education throughout Europe and the world.
equipment and darkrooms. Some disadvantages of the use of digital image technology are centered on issues of court admissibility due to the ease of image manipulation using programs such as Photoshop®. This problem has become less of an issue as software now generally provides logs and records of any edits that are done to the original. Thus, any changes to a digital image are recorded with that image and are easily retrievable.

*Figure 3.2* Capturing, analyzing, and storing the record of the crime scene.
The purpose of still photography documentation of the crime scene is to provide a true and accurate pictorial record of the crime scene and physical evidence present. As a result of this documentation, photography is used to record the initial condition of the scene. It provides investigators and others with a record that can be analyzed or examined subsequent to the scene investigation, and it serves as a permanent record for any legal concerns. Photography of a crime scene is normally done immediately following videography of the scene or after the preliminary scene survey. The number of photographs required varies from scene to scene and too many is always better than too few. Table 3.2 summarizes some general guidelines for crime scene photography. Every photograph that is taken at the crime scene must be recorded in a photo log. The log should include the time taken, camera settings used, an indication of distance to subject, the type of photograph taken, and a brief description of the image.

3.4.2 Forensic Mapping

Another forensic application to come out of the digital revolution is the use of imaging technology and mapping technology (GPS) to compile a crime scene map that can, in some cases, be rendered in three dimensions. There are several incarnations
of crime scene mapping hardware, but most include a method of electronic distance determination (also called electronic data collection, or EDC), height and slope measurements, mapping capability, and the ability to locate points in three dimensions (including elevation information). The data are downloaded to a program that then reconstructs the data and generates a three-dimensional map of the scene. This equipment is similar to that used by surveyors, and the practice of recording scenes this way is sometimes referred to as forensic mapping.

3.4.3 Notes

Effective notes as part of a crime scene investigation serve as a written record of all of the crime scene activities. The notes are taken as the activities are done so they are not subject to memory loss at a later time. A general guideline for note taking is to consider the “W’s” (who, what, when, where, and why), in addition to the following:

- **Notification information**—Note the date and time, method of notification, and information received.
- **Arrival information**—Note the means of transportation, date and time, personnel present at the scene, and any notifications to be made.
- **Scene description**—Note the weather, location type and condition, major structures, identification of transient and conditional evidence, containers holding evidence of recent activities (ashtrays, trash cans, etc.), clothing, furniture, and any weapons present.
- **Victim description**—In most jurisdictions, the body should never be moved or disturbed until the medical examiner has given approval. Once given permission, then note victim position, wounds, clothing, jewelry, or identification (its presence or absence).
- **Crime scene team**—Note assignments to team members, walk-through information, beginning and ending times, and evidence handling results.

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**TABLE 3.2 Guidelines for Photographing Crime Scenes**

<table>
<thead>
<tr>
<th>Type of Photograph</th>
<th>Guidelines for Photographing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall photographs</td>
<td>Exteriors—Surroundings, buildings and major structures, roads or paths of travel into or away from scene, street signs or survey markers, mailboxes or address numbers; take aerial photographs when possible; photograph before 10 a.m. or after 2 p.m. if possible. Interiors—Use the four compass points or room corners to orient photographs; overlap views; take photographs of doors leading into and out of the structure; use a tripod in low light situations for increased depth of focus.</td>
</tr>
<tr>
<td>Mid-range photographs</td>
<td>Follow a step-wise progression of views; use various lenses or change the focal length of the lenses to achieve a “focused” view of the individual items of evidence within the original view of the crime scene; add flash lighting to enhance details or patterned evidence.</td>
</tr>
<tr>
<td>Close-up photographs</td>
<td>Use documentation placards; use flash photography (flash must be detached from the camera); use proper side lighting effects; fill in with a flash when harsh shadows are present; take photographs with and without scales.</td>
</tr>
<tr>
<td>All photographs</td>
<td>Record in log; use camera settings that achieve good depth of focus; include no extraneous objects such as team members, equipment, feet, or hands; change point of view; be aware of reflective surfaces; when in doubt, photograph it!</td>
</tr>
</tbody>
</table>
Accurate crime scene note taking is crucial at the initial crime scene investigation, but it is also essential for any subsequent investigations that may follow. These notes must include accurate and reliable measurements of distances, locations, etc.

### 3.4.4 Video Recording Crime Scene

Video recording (videography) of the crime scene has become a routine procedure for crime scene documentation. Its acceptance is widespread due to its ability to provide a virtual image of the scene and the increased availability of affordable equipment with user-friendly features such as DVD recording, built-in stability, digital zoom lenses, and compact size. Jury acceptability and expectation have also added to the recognized use of video recording of the crime scene investigations. Videography of the crime scene should follow the scene survey in scientific crime scene investigation. It should not include any members of the crime scene team or their equipment. It should not be narrated and should not contain any audio recording of subjective information at the scene. The following summarizes the process that should be followed for effective videotaping of crime scenes:

- Document the recording by use of a placard that includes the case number, date and time, location, and videographer’s name.
- Begin with the scene surroundings. Include roads to and from the scene before taping the general views of the scene itself; use the four compass points as a guide.
- Provide a general orientation of the scene. Videotape the orientation of items of evidence in relation to the overall scene; wide-angle views are especially useful. Do not jump from one location to another; instead, use a smooth transition that encompasses the overall locations of evidence.
- Record the victim’s viewpoint. Move to a safe location near the victim and record the four compass points viewed away from the victim.
- Camera technique should include smooth movements; use a tripod or monopod if possible. Use additional lighting for all interior scenes (most camcorders have low-light automatic aperture corrections but additional lighting is suggested). Once videotaping has been completed, review it on the scene and reshoot the scene as needed.
- The original videos are evidence and should not be edited or changed; make copies when needed.

Video recording of crime scenes is a valuable tool for providing an overall, accurate impression of the crime scene that often cannot be accomplished by the other documentation tasks; however, it is never an adequate substitute for any of the other tasks.

### 3.4.5 Sketching the Crime Scene

The final task to be performed during documentation of the crime scene is sketching the crime scene, and a critical aspect of the crime scene sketch is obtaining and recording accurate measurements (Figure 3.3). All of the previous tasks for documentation record the crime scene without regard to actual size or measurement of the scene and its physical evidence. Sketching the crime scene assigns units of measurement and provides a proper perspective of the overall scene and the relevant physical evidence identified within the scene.
Sketching the crime scene is not difficult but does require some organization and planning by the investigator to ensure that the sketches are accurate. The two basic types of sketches as part of crime scene investigations are the rough sketch (Figure 3.3) and the final or finished sketch (Figure 3.4). Many types of perspectives are used for sketching crime scenes but the two most common are the overhead (or bird's-eye view) sketch and the elevation or side-view sketch. Occasionally, a combination perspective sketch, called a cross-projection sketch, is used to integrate an overhead

**Figure 3.3** Rough sketch.

**Figure 3.4** Finished sketch.
Crime Scene Investigation

sketch with an elevation sketch. Three-dimensional sketches or scaled models are not commonly used but can serve as another form of crime scene documentation. Three techniques are used to obtain measurements for the crime scene sketch: triangulation, baseline (fixed line), and polar coordinates (Figure 3.5). All three techniques identify two starting, fixed points, and all subsequent measurements of the crime scene are in relation to those points. The locations of these fixed points are known or can be precisely determined. This fixed nature is used for subsequent reconstruction. Good fixed points can be building corners, in-ground survey markers, large trees, or recorded utility poles.

All crime scene sketches require their own documentation, including a title or caption; a legend for the abbreviations, symbols, numbers, or letters used; a compass designation; the scale used, if drawn to scale; and the documentation block with the case number, offense type, victim name, location, scene descriptor, date and time when the sketch was begun, and the sketcher’s name.

3.4.6 Crime Scene Searches

The preliminary crime scene search is an initial quasi-search for physical evidence present at the crime scene. This search is for obvious items of evidence and is done for orientation purposes before the documentation begins. Once the scene documentation as described above is completed then a more efficient and effective search for less obvious or overlooked items of evidence must be done. This intensive search is done after documentation but before the evidence is collected and packaged. If any new items of evidence are found, then they must be subjected to the same documentation tasks that were carried out earlier.

Crime scene search patterns vary in style, but they share the common goal of giving the search organization a systematic structure to ensure that no items of physical evidence are missed or lost. There is no single method for specific types of scenes. The experienced crime scene investigator will be able to recognize and adapt the search method that best suits the situation or scene. It is important for the crime scene investigator to use that method. Simple reliance on their experience alone and omitting the search step in the investigation will produce mistakes, and significant evidence can be missed.

The most commonly employed search methods are geometric patterns: (1) link, (2) line or strip, (3) grid, (4) zone, (5) wheel or ray, and (6) spiral methods. Each has its advantages and disadvantages and some are better suited for outside vs. indoor
Forensic Science: An Introduction to Scientific and Investigative Techniques

crime scenes. Table 3.3 summarizes the various patterns. Before any intensive crime scene search is done, care must be taken to instruct the members of the search party. It is tempting for search party members to touch, handle, or move items of evidence found during the search. Instruct the members to mark or designate the items found without altering the item. In the Old West, firing a shot into the air was a common technique for letting others know that items of evidence had been found. Today, such an approach may not be appropriate, but with proper training, diligence, and care, no evidence will be mistreated during the search of the crime scene. Documentation of the found items must be done before any evidence can be moved or collected; this marks the birth of the item as evidence and the beginning of chain-of-custody procedures.

The practical application of search methods to the crime scene may involve the use of a combination of methods. Searching will frequently require field testing and the use of visualization and enhancement reagents for biological fluids or impression evidence. Also, keep in mind that searching the crime scene should never diminish or interfere with the other functions of the scene investigation, such as proper documentation, collection, and preservation of the physical evidence. Do not avert established crime scene procedures. Protection and preservation of evidence are paramount and can be addressed by restricting the number of searchers and subsequent collectors of evidence. As seen in Sidebar 3.3, in some cases extraordinary measures are required for crime scene searching and processing. Case Study 3.1 describes a more typical scene and how all the elements of crime scene processing come together.

### TABLE 3.3
Crime Scene Search Methods

<table>
<thead>
<tr>
<th>Search Type</th>
<th>Geometric Pattern</th>
<th>Information on Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link method</td>
<td></td>
<td>Based upon the linkage theory; most common and productive method; one type of evidence leads to another item; experiential, logical, and systematic; works with large and small, indoor or outdoor scenes</td>
</tr>
<tr>
<td>Line or strip method</td>
<td></td>
<td>Works best on large, outdoor scenes; requires a search coordinator; searchers are usually volunteers requiring preliminary instructions</td>
</tr>
<tr>
<td>Grid method</td>
<td></td>
<td>Modified, double line search; effective method but time consuming</td>
</tr>
</tbody>
</table>
| Zone method      | 1 2
|                  | 3 4                | Best used on scenes with defined zones or areas; effective in houses or buildings with rooms; teams are assigned small zones for searching; often combined with other methods; good for search warrants |
| Wheel or ray method |                  | Used for special situations; has limited application; best used on small, circular crime scenes |
| Spiral method    |                   | Inward or outward spirals; best used on crime scenes without physical barriers (e.g., open water); requires the ability to trace a regular pattern with fixed diameters; has limited application |
SIDEBAR 3.3. CURRENT EVENTS: CRIME SCENES IN THE TERRORIST AGE

Crime scenes are no longer confined to relatively small spaces. In the attacks of September 11, 2001, the collapse of the Twin Towers created the largest single crime scene ever processed (Figure S3.3.1). As a mass fatality incident, first responders were concerned first with rescue and then with recovery of human remains. Their activities had to be carried out alongside of crime scene processing using the same principles described in this chapter, albeit on a much larger scale. It was also a scene that integrated many forensic disciplines, from DNA analysts to forensic dentists and forensic engineers. Nearly 3000 people died in the attack.

Figure S3.3.1 Largest single crime scene ever processed.
CASE STUDY 3.1: BLOODSTAIN PATTERNS AND CRIME SCENES

A decomposing body was discovered in a bedroom (see Figure CS3.1.1). The dead man was dressed only in a bath towel and was shot twice at close range with a shotgun. Two television sets in the home were turned on and no signs of forced entry or ransacking of the premises were found. The state police crime scene unit responded. The investigators made sure the scene was secure, spoke with the first responders, proceeded with the preliminary scene survey, documented the scene, and collected and packaged the physical evidence found (Figure CS3.1.2). A male suspect was identified.

Within weeks of the discovery of the body, the investigation focused on two teenaged girls who were friends of the 50-year-old victim. Both of the girls knew the suspect. One of the girls periodically visited and drank alcohol with the victim during the three years before his death. The other girl had been romantically involved with the suspect. At first, both girls denied knowledge of the death; however, when the investigation focused on them, they claimed that the suspect said he had shot the victim. The girl who drank alcohol with the victim gave an even more detailed statement. She said she was an eyewitness to the shooting and that robbery was the motivation.

Her detailed eyewitness account of the shooting specifically stated that the suspect hid behind the door to the bedroom and emerged to face the victim who was entering the bedroom from the hallway, and shot the victim twice. The first shot was in the hallway near the door to the bedroom. The second shot was fired as the victim stumbled forward into the bedroom. According to the eyewitness, the victim then fell in the position in which investigators found his body. The eyewitness said the victim was facing toward the bedroom when he was shot and that the suspect faced toward the hallway entrance to the bedroom. She also told investigators that the suspect held a pillow in front of the shotgun when he shot the victim and that both blasts were fired while the suspect was partially hidden behind the bedroom door.

A not-to-scale crime scene sketch prepared by an investigator showed the locations of various items of physical evidence (Figure CS3.1.3). This sketch reveals that shotgun pellets were found in the bedroom at locations marked 7 through 10. The photographs and crime scene videotape revealed additional shotgun pellets and trajectory marks (Figure CS3.1.4). The crime scene report by the note taker at the scene shows that in the scene investigation no shotgun pellets or wadding were found in the hallway and that all of the pellets were found in the bedroom as documented in the photographs, videotape, and sketch.

The location of these shotgun pellets and the trajectory marks found in the bedroom led the investigators to believe that the shotgun was not pointed toward the hallway, as described by the eyewitness; rather, it was fired into the bedroom from the hallway (Figure CS3.1.3). The positions of the pellets, the trajectory marks, the position of the wadding, and the absence of pellets in the hallway, as documented by the crime scene investigators, contradicted the eyewitness’ account of the criminal act.

The crime scene videotape and photographs showed various bloodstain patterns in the bedroom and in the area of the hallway nearest the bedroom (Figure CS3.1.4). The bloodstain patterns were consistent with wounds