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# Geologic Material as Physical Evidence

By JOSEPH A. FINLEY, Jr., Ph.D.



*Whenever two objects come into contact, there always is a transfer of material. The methods of detection may not be sensitive enough to demonstrate this, or the decay rate may be so rapid that all evidence of transfer has vanished after a given time. Nonetheless, the transfer has taken place.<sup>1</sup>*

**T**he field of geology and its relationship to forensic science has remained shrouded in mystery for many years. Although the interaction of humans with the environment long has been the object of much interest to physical scientists, published literature on this topic is relatively limited.

Geologic material, commonly used as physical evidence in both criminal and civil cases, can play an important role

in forensic science. Geologic material, as with all physical evidence, contributes scientific support that can assist in establishing the guilt or innocence of an individual. In general, the usefulness of geologic material as physical evidence depends on the number of significant variations in the material and the ability to compare and contrast these variations. The inorganic nature of geologic material can make qualitative

identification relatively straightforward. Combined with the scientific objectivity of the analysis and testimony of the expert witness, geologic material has a great advantage as physical evidence. To this effect, investigators must ensure that they use proper collection and preservation techniques for processing and analyzing various materials.

## SOIL

Today, most major crime laboratories throughout the world, both public and private, study soils. The FBI was one of the first forensic laboratories in the United States to extensively use soil and mineral analysis in criminal cases.<sup>2</sup> As early as 1935, the FBI Laboratory worked with soils; by early 1939, heavy mineral separations and mineral identifications were

standard practices for the FBI Laboratory in soil cases.<sup>3</sup>

### Formation

Soil material generally is formed by nature in one of two ways, residual or transported. This loose material (soil) is composed of fragments of minerals and rocks generated from the breaking up or dissolving of the earth's solid rocks. Residual soil material forms in places where solid rock is exposed in outcrops at the earth's surface. This solid rock endures the natural weathering processes, which, over time, break up and dissolve the rock. This procedure turns the outcrop into a mass of fragments and removes some of the material in solution (dissolving of the minerals normally occurs in rain or groundwater).

Transported soil materials occur where fragments of

minerals are produced elsewhere and transported to the location where they are found. Fragments of rocks and minerals created by the weathering of a rock outcrop may be carried away by rivers and deposited as sandbars, gravel, or fine mud. Wind can move vast quantities of fragments great distances, depositing them as dunes and dust layers. Wave and current actions break down rock and mineral formations along shores of seas and lakes, transporting this material and depositing it as beaches or undersea sediment. The force of gravity may cause landslides and move tons of material down a slope, thereby producing a mass of newly transported soil on the land below.

### Composition

Characteristically, soil is a very complex system composed of certain quantities of solid, liquid, and gaseous materials. The unconsolidated mineral matter on the earth's surface has been subjected to and influenced by genetic and environmental factors, such as parent materials, climate (including moisture and temperature effects), macro- and microorganisms, and topography. Over a period of time, these factors produce a product (soil) that differs from the material from which it derived in many physical, chemical, biological, and morphological properties and characteristics.<sup>4</sup>



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***...investigators must ensure that they use proper collection and preservation techniques for processing and analyzing various materials.***

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*Special Agent Finley, formerly an expert witness in the Mineralogy Unit, FBI Laboratory Division, now serves in the FBI's Miami, Florida, office.*

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The important distinction in a forensic definition of soil appears in the sampling of earth material, either accidentally or deliberately. For forensic purposes, the definition of soil is earth material collected accidentally or deliberately and associated with a matter under investigation. In general, the usefulness of most types of physical evidence, recognizing that probability and chance are most important, depends on the number of significant variations easily observed and measured in the material; specifically, how many different kinds of classes can exist and how widespread each class is. The value of soils, rock, minerals, and fossils lies in the fact that many variations and possibilities exist. Any process that aids in generating a uniquely identifiable material determines the value and type of examinations that will prove most useful. These processes constitute the keys to a meaningful soil comparison from which the forensic scientist can draw valid conclusions.

Soils pass through a cycle of development involving youth, maturity, and old age.<sup>5</sup> Based upon this readily accepted concept of soil alteration, the comparison of soil by color, texture, and mineral composition is justified. Color is one of the most important identifying characteristics of minerals—virtually all possible colors of the visible

light spectrum occur. With most geologic materials and soils, the native minerals contribute directly to the soil color, as well as organic matter present.

Soil structure, an arrangement of the soil particles, can be recorded descriptively. Some soils, particularly loose sands, consist of a structureless mass, whereas most soils tend to cluster together to form compound structures. Particle sizes of soil

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***Evidence value rests upon the fact that soil varies from point to point on the surface, as well as below the earth's surface.***

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minerals are classified as sand, silt, and clay (based on a physical measurement). A wide range of textural (particle) size exists in soil, depending upon the rocks from which it derived and the processes by which the soil has accumulated.<sup>6</sup> Soils are coarse- or fine-grained.

Soil structure constitutes one of the most important soil properties, but forensic scientists must approach it carefully due to the inherently smaller sample sizes. In most soil samples, mineral composition is the

constituent material that relates directly to the ability to compare it by using a microscope. The importance of mineral composition is apparent in soil because minerals can comprise approximately 45 percent of an entire sample.<sup>7</sup> Geologists use various methods to positively identify the sample. The soil examination associates or disassociates a “known” sample from a “questioned” sample. Some techniques used to make this comparison may destroy the sample; therefore, appropriate personnel should use them accordingly.

Because forensic geologists must be aware of the context and source of the samples examined, investigators should ensure that they remove earth material from clothing, vehicles, or other sources with extreme care, ensuring preservation of the original sample. Specifically, investigators should pay close attention to layering and lumps of materials.<sup>8</sup>

Evidence value rests upon the fact that soil varies from point to point on the surface, as well as below the earth's surface. For depth of the sample, investigators should note the approximate depth of their own footprints in the soil at the scene. Investigators should take numerous samples at the immediate scene radiating outward from the center and also an “alibi” sample away from the immediate scene. This type of sampling will allow

## Examining Geologic Evidence

The stereobinocular microscope helps identify the various minerals and mineral sites present in a sample. The widefield, low-power stereobinocular microscope gives an erect, three-dimensional image that makes it ideal for manipulating a sample. Minerals also have different densities, an identifiable property. Normally, these differences are divided into two groups of "heavy minerals" and "light minerals" with the boundary drawn at approximately 2.9 grams/cc.

Additionally, forensic geologists use a polarizing or petrographic microscope to positively identify the sample. This differs from the stereobinocular microscope in that it has filters for polarizing the light and rotating the state and attachments for viewing the characteristic effects on light that has passed through minerals. Minerals, especially small-sized ones, commonly are identified using x-ray diffraction and spectrographic techniques. Other instruments of value to the forensic geologist exist, particularly the scanning electron microscope and the electron microscope. With these instruments, geologists can examine extremely small mineral particles using magnification in excess of 100,000 times. Where applicable, pH-size particle determination and elemental analysis may be used in conjunction with color, texture, and mineral composition.

the forensic geologist to see any variation. If sample variations are wet or moist, investigators should air-dry them before placing them in a vial or similar container to prevent biological activity from continuing and to avert any breakdown of the sample. The amount of sample required for analysis depends on the type of examination conducted; however, most analyses require approximately 1 cup of soil. If considerable gravel or other coarse material is present, investigators should increase the size of the sample. They can make the first determination of the soil's color at the scene, for example, and the color of the soil on a suspect's clothing. They should ensure that the soil is dry

when packaged and limit the possibility of contamination. Only plastic locking bags or glass vials should be used, never envelopes.

### BUILDING MATERIALS

Building materials long have been an important part of people's interaction with and impact upon their environment. Natural materials used to form manmade products that will become part of a structure, dwelling, or similar fixture can be classified as building materials.

When handling building materials, investigators must consider the various types of combinations at a given location. Because building materials commonly are made of mineral

materials and represent the combination of a variety of minerals or rocks at a specific time for a certain purpose, they can be highly distinctive. Regional differences in the base aggregates used to produce these materials prove useful to the forensic scientist. Different building materials contain suitable aggregates, such as quartz, gravel, crushed stone, bituminous or anthracite cinders, burned clay or shale, and pumice or volcanic scoria, all of which may indicate a particular geographic area.<sup>9</sup>

Building materials can include bricks, cinder and concrete blocks, cement, plaster, ceramics, fiberglass, abrasives, cleaning and face powders, and commercial sands. Each

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particular type of material lends itself to similar comparative examinations. Most plaster and cement contain rock and mineral particles. Investigators must ensure that these materials are placed in airtight containers and not heated again, as in the initial formation, to prevent the possible conversion of the gypsum back to the plaster, or low-water, form.

Cleaning and face powders commonly have a mineral base or mineral filler. The specific minerals used tend to differ from one product to another, and manufacturers often change the size and composition of minerals through time. Abrasive materials may be natural or artificial—natural materials tend to be more diverse. Further, a wide variety of sands are used for commercial purposes.

The alteration of the environment with building materials can prove important to the forensic scientist who will use various methods to examine building materials broken down into several areas. However, for the forensic scientist to make an accurate determination, investigators should sample all types of material present at the scene. Most cases involving building materials are related to burglaries where someone has broken into a dwelling or structure. Brick, cinder block, fiberglass, and gypsum board most likely would be involved, and investigators

should take representative samples of each material. They should package materials in appropriate containers, such as plastic locking containers, to avoid any chance of contamination.

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***Soil, building materials, and safe insulation...can benefit law enforcement agencies as evidence in cases.***

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#### **SAFE INSULATION**

Found between the walls of fire-resistant and burglar-resistant safes and safe cabinets, safe insulation often is soft and very porous and, therefore, can be readily transferred to tools and clothing. Various types of materials are used as safe insulation, including wood chips, gypsum, fiberglass, and asbestos. Many safes made before 1936 contain natural cement as insulation.

Collecting safe insulation at a crime scene is a relatively simple procedure. If the safe is present at the scene, investigators should take samples of all walls because replacement of one or more walls with different safe insulation is common. Investigators should keep the

sample dry and intact to prevent destroying any of the unique physical characteristics of the insulation. Additionally, they should ensure that cross-contamination of specimens does not occur. Investigators should leave any questioned material intact on the specimen because removing the insulation may render its value worthless in the forensic examination.

#### **CONCLUSION**

Geologic material can prove an invaluable tool as physical evidence in criminal and civil proceedings. The field of forensic geology can expand to contain virtually all inorganic materials used as physical evidence. Soil, building materials, and safe insulation represent just three examples of the numerous types of geologic materials that can benefit law enforcement agencies as evidence in cases.

The usefulness of most types of physical evidence depends on the number of significant differences that exist in the material. Nature has provided geologic materials with large variations and possibilities.<sup>10</sup> Investigators must ensure that they follow appropriate procedures when securing, packaging, and preserving geologic materials. The forensic scientist then can provide an expert opinion to the inference or conclusion drawn from facts determined during the examination of these materials. ♦

## Endnotes

<sup>1</sup> The Locard exchange principle, developed by Edmond Locard in 1929, is the basic precept of forensic geology.

<sup>2</sup> R. C. Murray and C. F. Tedrow, *Forensic Geology* (Englewood Cliffs, NJ: Prentice-Hall, Inc., 1992), 23-24.

<sup>3</sup> Ibid.

<sup>4</sup> G. D. Smith, et al., "Glossary of Soil Science Terms," *Soil Science Society Proceedings* 26, no. 3(1965): 305-317.

<sup>5</sup> A. K. Lobeck, *Geomorphology: An Introduction to the Study of Landscapes*,

*Soils* (New York, NY: McGraw Hill, 1939).

<sup>6</sup> L. C. Nickolls, "Identification of Stains of a Nonbiological Nature," in F. Lundquist, ed., *Methods of Forensic Science, 1* (New York, NY: Interscience Publications, 1962), 355-362.

<sup>7</sup> Although scientists have identified over 2,000 minerals, only about 20 are commonly found in soils, with the bulk of soil containing only 3 to 5 different minerals.

<sup>8</sup> Two possible types of "known samples" exist: samples collected from the

crime scene, or "alibi" location, and samples scientists use as part of their normal professional resources. "Known samples" from scientists' normal professional resources are numerous and varied. Use of these samples for comparison may provide the scientist with a correct identification of the material and, in some cases, the particular area of origin.

<sup>9</sup> American Society for Testing Materials Standards, *Book of ASTM Standards*, 1955, 421-611.

<sup>10</sup> Supra note 2.

## Book Review



**Law Enforcement Funeral Manual,**  
by William P. Sanders, Charles C. Thomas,  
Publisher, Springfield, Illinois, 2001.

Death is never easy. However, whenever it strikes within a law enforcement agency,

it can have long-lasting effects on officers and administrators alike. Therefore, to cope with such a tragedy, it is imperative for an administrator to be prepared. Less than 100 pages long, the *Law Enforcement Funeral Manual* provides sample funeral services, memorials, poems, short readings, and hymns for use under a wide range of circumstances. Containing information gathered by the International Conference of Police Chaplains, the book presents administrators and law enforcement personnel with the tools to help promote healthy healing. In addition, this manual provides services for multiple religious beliefs. Overall, this concise, helpful book compiles components necessary to conduct a thoughtful and appropriate ceremony for a law enforcement funeral.

Chapter 1 provides a brief overview on how to notify family members or loved ones regarding the death of an officer. The author strongly suggests that the department enlist the services of a police chaplain when making notifications.

Chapter 2 describes the basic elements of the law enforcement funeral. The author examines U.S. flag etiquette and the use of pipe and drum corps, bugler, honor guard, badge mourning bands, flowers, and ribbons in detail. This chapter also offers special religious funeral considerations for those officers of varied beliefs (e.g., Buddhist, Hindu, Islamic).

Chapter 3 gives the law enforcement administrator the entire funeral services for officers killed in the line of duty, killed off duty, and retired. As part of the funeral service, the author provides prayers, scriptures, readings, hymns, and closing benedictions. In addition, this chapter provides necessary information on how the motorcade would proceed to the cemetery. This latter point often is overlooked in prior planning and policy determination.

While the first three chapters focus on the deaths of human officers, chapter 4 contains memorial services for law enforcement service animals. Although most agencies have existing policies regarding officer deaths, work dogs and horses rarely are mentioned, even though their deaths occur much more frequently. As a result, administrators often are at a loss as to how to handle these events. This chapter fills a much-needed void in the extant literature.

Chapter 5 offers those conducting memorial services poems, prayers, hymns, and short

readings specifically designed for officers who have passed away. In addition, this chapter mentions the needs of the survivors and points out the necessity of advising family members and loved ones that the agency will be honoring the deceased officer in ceremonial fashion. To promote healthy healing, this chapter also focuses on survivor resources and support agencies.

In the appendices, the author provides a sample departmental policy or standard operating procedure model that can be modified quickly to assume the needs of the individual agency. Additionally, a funeral checklist contains the important components in a handy, to-do format, as well as a model for debriefing personnel after critical incidents.

The *Law Enforcement Funeral Manual* is a well-designed guide for police administrators. It is presented in a fashion that is acceptable to those having no experience in police funerals, as well as seasoned veterans and clergy alike. Although it is in sharp contrast to most law enforcement publications, the manual provides basic information that an agency can use to quickly and professionally prepare after tragedy strikes. It should be a necessary, if not totally welcome, addition to any law enforcement agency's library.

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# Focus on Identity Theft



**I**dentify theft is a rapidly growing crime that has reached the hallowed halls of academia. Identity thieves have targeted U.S. Department of Education federal student aid programs, with a potential impact on million of students at thousands of institutions of higher learning nationwide. The department processes over 11 million applications for student financial aid and disburses over \$60 billion a year in federal student aid funds.

The department's Office of Inspector General (OIG) serves as its law enforcement arm. With regional offices and over 70 special agents, the OIG investigates allegations of identity theft involving federal student aid funds in conjunction with the U.S. Attorney General's Office. Within the last year and a half, OIG investigations conducted along with other federal, state, and local police have resulted in over \$1 million in court ordered restitutions. And, the numbers continue to grow.

The methods that these perpetrators employ vary from the fraudulent use of personal information belonging to family members and friends to conspiracies that involve groups of individuals who have access to student information. Identity thieves also have used the identities of deceased

individuals and prison inmates to apply for and obtain federal student aid. Beginning in 2002, the department began checks of Social Security numbers against death records to identify the fraudulent use of numbers formerly issued to deceased individuals.

A recent example of student identity theft resulted in a 26-count indictment against an individual in U.S. District Court, Western District of New York, for his role in allegedly defrauding the Department of Education of over \$160,000 by submitting fraudulent student loan applications in the name of his mother and brother. The indictment also charged that the individual prepared and submitted approximately 2,370 additional student loan applications requesting disbursement of approximately \$43.8 million. These applications were prepared using multiple fictitious identities that claimed attendance at various colleges in the United Kingdom.

OIG collaboration with the Mesa Police Department, Mesa Community College, the Social Security Administration, and the U.S. Secret Service recently resulted in an individual pleading guilty to one count of student aid fraud and one count of identity theft. He also admitted to forfeiture allegations. The investigation revealed that he had assumed over 50 different identities to obtain approximately \$313,000 in federal student aid. Many of the victims were prison inmates. He faces a potential sentence of 20 years and a \$270,000 fine. Because he admitted to forfeiture allegations, he faces forfeiture of his house, car, computer and electronic equipment, and nearly \$70,000 in cash and bank accounts.

Crimes such as these have resulted in Secretary of Education Roderick Paige, Inspector General John Higgins, and Federal Student Aid Chief Operating Officer Theresa Shaw launching an identity theft prevention initiative to alert students who are particularly vulnerable to this type of financial crime. The Web site [www.ed.gov/misused](http://www.ed.gov/misused) provides information about how to prevent and report identity theft that involves federal

student aid funds. The OIG has increased its data-mining efforts to identify potential trends and patterns involving identity theft and other crimes involving fraud against the student aid programs. As a result of data mining, the OIG also was able to assist other federal law enforcement agencies identify foreign nationals with terrorist links who fraudulently obtained student aid.

The OIG will continue in its efforts to combat identity theft by conducting investigations

involving individuals who steal personal information to commit fraud within federal student aid programs. The OIG seeks to expand its role in preventing student aid identity theft by working with other law enforcement agencies and educating students to the long-term economic threat this crime poses. ♦

*Sharon Jones-Davis is a program management analyst at the U.S. Department of Education, Office of Inspector General, Investigation Services.*

## Unusual Weapon Alert

### **Bullet Cartridge Knives**

This unusual weapon appears to be a rifle cartridge with a head stamp that reads “30-06 SPRG.” Instead, it has a sharp metal blade inside that poses a serious threat to law enforcement officers.



This weapon looks like a handgun cartridge, but contains a sharp metal blade with a head stamp that reads, “30-06 SPRG.” Law enforcement officers should be aware of the possible threat of this weapon.



# Sudden, Unexplained Infant Death Investigations

By ERNST H. WEYAND

**I**nvestigating sudden, unexplained infant death (SUID) in the United States serves as one of the many challenges facing law enforcement officers. Federal, state, and local investigators alike often receive little introduction to SUID and do not fully understand their role in a SUID investigation when required to handle one. A more complete understanding of this role can enable law enforcement officers to work effectively

through a SUID investigation, providing a much greater chance of an accurate determination of what caused or contributed to a child's death.

## SUID AND SIDS

SUID cases involve infant deaths that occur outside of a doctor's care without an immediate explanation of their cause. People should not confuse SUID with sudden infant death syndrome (SIDS),<sup>1</sup> which refers to

the sudden death of a child under 1 year of age that remains unexplained even after a thorough case investigation<sup>2</sup>—scientists call it a “diagnosis of exclusion.” SIDS is the most frequently determined cause of SUID.<sup>3</sup>

SUID investigators should consider that SIDS claims more infant lives in the United States than congenital anomalies, illnesses, injuries, and homicides combined. In fact, SIDS deaths outnumber abuse and neglect

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deaths in children under 1 year of age nearly 9 to 1.<sup>4</sup> Law enforcement officers that investigate infant deaths on Indian reservations must face an even more alarming concern: SIDS deaths among Native American babies occur at a rate of nearly 3 times the national average (6 per 1000) for that of Caucasian infants (2 per 1000)—in North and South Dakota, the rate is approximately 4 times that figure (8 per 1000).<sup>5</sup>

### **THE SUID INVESTIGATION**

Agencies should treat the sudden, unexplained death of an infant like any other mysterious death. A meticulous investigation must begin immediately to determine if criminal behavior caused or contributed to the death of the child. Often, if investigators find no such evidence during the initial stages of a SUID case, health professionals (e.g., medical examiners, forensic pathologists, and coroners) in large metropolitan areas with ample investigative resources complete the investigation to determine the cause and manner of the infant's death. In more rural areas where these means may not exist, law enforcement officers commonly assist them in solving these cases. Regardless, without a complete investigation, the circumstances surrounding a baby's death will remain a mystery.

Approximately 15 percent of SUID investigations will identify a cause of death other than SIDS.<sup>6</sup> Murder serves as one example—in 2000, the homicide rate for children under the age of 1 year reached a 30-year high (9.1 murders per 100,000 infants), a number twice that reported in 1970 and nearly equivalent to the 2000 homicide rate for American teens between the ages of 15 and 19.<sup>7</sup> Many researchers consider this number low, not accurately depicting the number of infant murders in the United States.

Many law enforcement officers find the SUID investigation enigmatic; instead of looking for possible wrongdoing, they often must focus their efforts on establishing an overwhelming lack of evidence. In other words, an investigator engages in an

“investigation of exclusion” by examining various areas outside the normal scope of a criminal case to rule out such possibilities as abuse, neglect, environmental factors, illness, accidental asphyxiation, or strangulation. To streamline this process and to ensure that they do not overlook critical evidence, officers should consider dividing a SUID investigation into four general categories: the death scene analysis, the autopsy, an examination of the infant's medical history, and a review of the family case history.

### **The Death Scene**

The death scene is the phase of a SUID investigation most affected by the passage of time. To work efficiently, investigators must know what to look for and how to document the findings. Officers should begin at the

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***...without a complete investigation, the circumstances surrounding a baby's death will remain a mystery.***

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place where the infant's death was pronounced and quickly move to the location (if different) where the baby was found dead or unresponsive. If possible, investigators ought to occupy both places as soon as the death is reported and quickly identify the individuals who located the child because their observations can greatly assist the re-creation of the death scene.

At the scene, investigators should describe, in detail, the site where witnesses found the baby. For example, if the death occurred at home in the infant's bedroom, officers ought to include a description of the room, as well as their observations of the sleeping surface. Investigators must take great care in documenting these details (e.g., "The mattress is too small for the crib" or "Officers noticed a broken spring in the bedding"). They also should determine if anyone was sleeping with the child at the time of death and if this person was impaired by alcohol or other drugs. After examining the sleeping site, investigators then would record a variety of environmental factors, including inside temperature, outside temperature, type of heating present, type of air conditioning, any humidifier or vaporizer use, type of flooring, state of the home's cleanliness, number of people living in the residence, and any presence of animals.

The collection and thorough documentation of physical evidence at the death scene can prove essential in accurately establishing an infant's cause of death. Items considered important to a SUID investigation include the baby's clothes and diaper, bedding, formula, time and contents of the last bottle, over-the-counter or prescribed drugs

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**People should not confuse SUID with sudden infant death syndrome (SIDS)....**

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or medications, and other appropriate items, such as folk remedies or unpasteurized honey (if ingested within 30 days of the time of death). In addition, investigators should collect any toys located nearby and document their relative position to the child.

Officers also must meticulously document the baby's general appearance. This serves as a critical portion of the death scene investigation and provides invaluable information to the health professional—in this regard, investigators can communicate more effectively when

familiar with basic medical concepts and terms related to infant death. When documenting the general appearance of the child, officers should note the body, face, head, and neck positions; rigor mortis; postmortem lividity (creating a drawing and depicting the pattern); birthmarks; body temperature; physical development; evidence of trauma; state of hydration; and any fluids (e.g., vomitus, blood, mucus, or other secretions) or obstructions present in or around the baby's mouth or nostrils. Additionally, they ought to document all attempts to resuscitate the child, along with any physical signs of attempted resuscitation (e.g., endotracheal tube, chest ecchymosis,<sup>8</sup> EKG monitor pads, or intravenous lines).

### **The Autopsy**

The forensic autopsy of the infant serves as a critical step in a SUID investigation. Without a thorough autopsy by a competent, experienced health professional, the cause and manner of the baby's death will remain in question. The law enforcement officer plays a critical, though limited, part in this phase of the investigation. While carrying out their role in this process, investigators ought to remain sensitive to the needs of the child's family and effectively explain the importance of a forensic autopsy.

### Considerations During a SUID Investigation

1. *Remain sensitive to the family, but stay focused.* Although painful for the family, a detailed investigation may shed light on the true cause of death.
2. *Time is critical.* Crucial evidence will become lost or destroyed if the investigation does not begin immediately.
3. *Trust your investigative instincts.* Remain alert to the possibility of rollover death (also referred to as overlying death), accidental suffocation, strangulation, positional asphyxiation, child abuse, child neglect, or homicide. Investigators should use their experience, training, and judgment to develop additional leads in any stage of the SUID investigation.
4. *Use a SUID investigative protocol.*<sup>9</sup> This written checklist, or guide, ensures that investigators do not overlook critical evidence during the “investigative window” of a SUID investigation.

First, the officer obtains parental consent, a coroner’s directive, or a court order authorizing the autopsy. Next, the investigator must coordinate the transportation of the infant (while maintaining a proper chain of custody). The officer also should make efforts, early in the investigation, to obtain the baby’s medical records, as well as documentation of the mother’s prenatal care. Copies of these records ought to accompany the infant to the autopsy. Finally, the investigator should remain available, either in person or by telephone, to provide input and observations to the health professional at the time of the autopsy.

#### The Infant’s Medical History

Investigators can gather much of the information about

the child’s medical history from records, as well as interviews with parents, guardians, or caretakers—of course, if the infant’s death resulted from abuse, neglect, or homicide, these individuals may be suspects. Important information to gather during this phase of the investigation includes if the baby had an illness within 48 hours of the time of death, received any medications (prescribed or over the counter), or exhibited any recent changes in behavior or sleeping habits. Officers also should determine if the infant had exposure to tobacco smoke or illicit drugs at any time.

As the investigation into the child’s medical history continues, the investigator must determine if the infant experienced previous traumatic injuries, had

illnesses not documented in medical records, or contracted illnesses or medical complications during the first week of life. If the baby required resuscitation at any time since birth, it should be documented in detail. In addition, officers ought to determine if the child ever required oxygen, an apnea monitor, pacemaker, or antibiotic or anticonvulsant medications.

To complete the medical history, the investigator must examine the date and circumstances of the infant’s last doctor’s visit; determine if the child ever received emergency room attention and, if so, under what circumstances; and ascertain if the baby ever required a hospital stay or surgery. The officer also should document, in detail, the infant’s immunizations and

when they were administered. Finally, the investigator ought to develop information about the child's feeding history (e.g., Did the infant have any food intolerances?) and establish the baby's exposure to illness through contact with adults or animals.

### **The Family's Case History**

A review of the infant's family case history may prove the most time-consuming part of a SUID investigation. The investigator begins by interviewing immediate family members to determine if they have experienced any suspicious childhood accidents, a history of infant or childhood death, SIDS, congenital anomalies, infections, pneumonia, premature birth,

life-threatening trauma, HIV, hepatitis, or sickle-cell anemia. If so, the officer ought to conduct a logical and thorough investigation to gather as much information as possible about each particular instance. If necessary, the investigator should widen this phase of investigation to include extended family members. After the interviews of family members, the officer must contact an appropriate agency, such as social services or child protection services, and inquire about any family contacts and the nature of these contacts.

The investigator also needs to examine and document the mother's prenatal history and medical care. Information ought to include any health problems

(e.g., anemia, diabetes, high blood pressure, infections, physical trauma, or sexually transmitted diseases) or use of alcohol, controlled substances, or tobacco during pregnancy. In addition, the officer should determine if the mother had any previous pregnancies, previous live births, previous abortions or miscarriages, or a history of fertility treatment.

Finally, the investigator ought to document the infant's gestational age (considering 40 weeks as "full term") and weight at birth, method of delivery (vaginal birth or cesarean section), and if the baby was part of a dual or multiple birth. To ensure completeness, the officer should determine the age and

### **Online Resources**

- SIDS Alliance  
*<http://www.sidsalliance.org>*
- Interagency Panel on Sudden Infant Death Syndrome  
"Guidelines for Death Scene Investigation of Sudden, Unexplained Infant Deaths"  
*<http://www.cdc.gov/mmwr/preview/mmwrhtml/00042657.htm>*
- Office of Juvenile Justice and Delinquency Prevention  
"Recognizing When a Child's Injury or Illness Is Caused by Abuse"  
*[http://www.ncjrs.org/html/ojjdp/portable\\_guides/abuse\\_02/key.html#sids](http://www.ncjrs.org/html/ojjdp/portable_guides/abuse_02/key.html#sids)*
- Canadian Association of Chiefs of Police  
"Code of Police Practice - A Guide for First-Line Officers"  
*[http://www.rcmp-learning.org/copp/encopp/d\\_infant.htm](http://www.rcmp-learning.org/copp/encopp/d_infant.htm)*

health of the other children in the infant's family and describe the family's demographics (e.g., employment, education, income, ages of parents, and citizenship).

After examining and documenting the family history, the SUID investigator must contact the health professional involved with the case and provide the information gathered during the investigation. A discussion of these findings then determines the need for additional work by the officer. Regardless, the investigator must remain available to provide input as necessary during the autopsy/investigation to help determine cause and manner of death.

## CONCLUSION

Law enforcement officers can play a crucial role in SUID investigations. The information gathered during an extensive analysis of the death scene, examination of the infant's medical history, and review of the family case history can greatly supplement the autopsy results and enable the medical professional to properly interpret postmortem findings.

Sudden, unexplained infant deaths can prove challenging to both the law enforcement and medical communities. The team effort between the investigator and the health professional in ensuring a thorough, complete

investigation is essential in establishing the true cause and manner of an infant's death. ♦

### Endnotes

<sup>1</sup> For further information, see Linda Esposito, Larry Minda, and Claire Forman, "Sudden Infant Death Syndrome: Police Can Make a Difference," *FBI Law Enforcement Bulletin*, September 1998, 1-5.

<sup>2</sup> A thorough case investigation includes a complete autopsy, an examination of the death scene, and a review of the infant's clinical history. See Jodi Shaefer, Kathleen Fernbach, and Mary McClain, "SIDS Is Not Homicide But..."; retrieved on September 17, 2003, from [http://www.asip1.org/sid\\_not\\_homicide.html](http://www.asip1.org/sid_not_homicide.html). Without such an analysis, an infant death cannot be attributed to SIDS; it must remain in the "undetermined" or "unexplained" category.

<sup>3</sup> Interagency Panel on Sudden Infant Death Syndrome, "Guidelines for Death Scene Investigation of Sudden, Unexplained Infant Deaths"; retrieved on September 17, 2003, from <http://www.cdc.gov/mmwr/preview/mmwrhtml/00042657.htm>.

<sup>4</sup> Arizona SIDS Advisory Council, *Facts About Sudden Infant Death Syndrome (SIDS) for Police Officers and Pre-Hospital Personnel*, Infant Death Support Series (April 29, 1994).

<sup>5</sup> Department of Health and Human Services, *Mi Cinca Kin Towani Ewaktonji Kte Sni*, Results of the Aberdeen Area Infant Mortality Study (June 6, 1998).

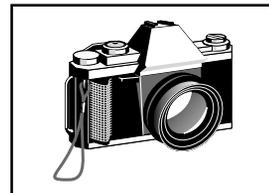
<sup>6</sup> *Supra* note 3.

<sup>7</sup> Laura Sessions Stepp, "Infants Now Murdered As Often As Teens," *The Washington Post*, December 10, 2002, sec. A, p. 3.

<sup>8</sup> Evidence of ruptured blood vessels.

<sup>9</sup> A model protocol is available at <http://www.fbi.gov/hq/cid/indian/about.htm>.

## Wanted: Photographs



The *Bulletin* staff is always on the lookout for dynamic, law enforcement-related photos for possible publication in the magazine. We are interested in photos that visually depict the many aspects of the law enforcement profession and illustrate the various tasks law enforcement personnel perform.

We can use either black-and-white glossy or color prints or slides, although we prefer prints (5x7 or 8x10). We will give appropriate credit to photographers when their work appears in the magazine. Contributors should send duplicate, not original, prints as we do not accept responsibility for damaged or lost prints. Send photographs to:

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# Bulletin Reports

## Corrections

The National Institute of Corrections (NIC) presents *Gender-Responsive Strategies: Research, Practice, and Guiding Principles for Women Offenders*, which summarizes current knowledge on the characteristics of women in correctional settings, the ways in which gender makes a difference in current criminal justice practice, and multidisciplinary research and theory on women's lives that have implications for managing women in the criminal justice system. For availability and ordering information, contact the NIC

Information Center at 800-877-1461 and reference accession number 018017.

This publication also is available electronically at <http://www.nicic.org/pubs/2003/018017.pdf>.

## Juvenile Justice

The Office of Juvenile Justice and Delinquency Prevention (OJJDP) presents *Juvenile Gun Courts: Promoting Accountability and Providing Treatment*, which draws on the experiences of policymakers and practitioners involved with juvenile gun courts to describe their development. Juvenile gun courts are targeted interventions that expose youth charged with gun offenses to the ramifications of such acts. Like its better-known counterpart, the youth drug court, the juvenile gun court is a specialty court that features small case loads, frequent hearings, immediate sanctions, family involvement, and treatment services. This bulletin, part of the Juvenile Accountability Incentive Block Grants Best Practices Series, reviews the OJJDP-supported Jefferson County, Alabama, Juvenile Gun Court. This report is available electronically at <http://ojjdp.ncjrs.org/pubs/courtsum.html#187078> or by contacting the National Criminal Justice Reference Service at 800-851-3420.

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## *Training*

The Office of Community Oriented Policing Services (COPS) presents *Mutual Respect in Policing*, a teaching aid for instructors and facilitators who provide information to police officers on the subject. This videotape and lesson plan provide officers with a greater awareness of respectful police behavior, help them strengthen their ability to work toward better community relationships, and enhance their awareness of culturally sensitive issues. The video contains five scenarios of police-citizen interaction that can be presented separately during successive roll calls or together in

one classroom presentation. The lesson plan guides the instructor through the training video, highlights teaching points, and poses specific questions about the scenarios from the video.

Availability and ordering information are available through the U.S. Department of Justice Response Center at 800-421-6770.

## *Web-Based Resources*

The Bureau of Justice Statistics (BJS) presents *Homicide Trends in the United States*, a section of its Web site that contains over 50 charts that describe homicide patterns and trends in the United States since 1976. Homicide is of interest not only because of its severity but also because it is a fairly reliable barometer of all violent crime. This site can be accessed at <http://www.ojp.usdoj.gov/bjs/homicide/homtrnd.htm>.

**Bulletin Reports** is an edited collection of criminal justice studies, reports, and project findings. Send your material for consideration to: *FBI Law Enforcement Bulletin*, Room 209, Madison Building, FBI Academy, Quantico, VA 22135. (NOTE: The material in this section is intended to be strictly an information source and should not be considered an endorsement by the FBI for any product or service.)



# Community Policing

## Exploring the Philosophy

By DAVID M. ALLENDER

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A discussion concerning the definition of community policing can include vastly different connotations, depending upon the views held by those involved. Street-level officers might conjure up a scenario that requires the transfer of officers from traditional enforcement duties to an assignment that requires little “police action” but, instead, concentrates on helping citizens confront “order maintenance” issues. Community groups may

envision a police force that responds exclusively to the demands voiced by them. Researchers usually define the model by their particular orientation. Politicians typically support the concept, but often remain unsure of what the theory means. Law enforcement administrators tend to view the idea as another federally supported initiative that they must implement to receive grant funds. Finally, officers and citizens working in a successful project often reach a

consensus interpretation entirely dissimilar to any of these. With such a wide range of viewpoints, formulating a definition of community policing becomes a daunting task. However, one explanation highlights nine words that can provide the key to better understanding the concept.

Community policing is a *philosophy* of full-service, *personalized policing* where the same officer *patrols* and works in the same area on a *permanent* basis, from a

decentralized *place*, working in a *proactive partnership* with citizens to identify and solve *problems*.<sup>1</sup>

Based on this definition, the first indication that this form of policing differs from other approaches is its label as a philosophy. Three other critical aspects include personalized, partnership, and problem-solving ingredients. Other identified factors, while important, are not as essential to understanding the concept of community policing.

### CHANGING THE APPROACH

Over the years, American society has embraced a number of policing methodologies. Many scholars have defined the type of work done by officers in the 1950s through the early 1970s as “traditional” policing. This terminology, in fact, can prove misleading. Several factors, including the massive shift of many police forces into vehicles equipped with radios, reform initiatives designed to remove politics from the police agencies, and early steps toward professionalism, already had altered the methods and tactics employed by law enforcement. Moreover, not everyone in the profession accepted the traditional policing approach.

To this end, several law enforcement agencies attempted to implement “team policing” in the 1980s. Poorly defined

and improperly marketed to law enforcement and the public, this model had little chance of success. Rising crime rates, especially in the categories of violent crime, dictated the need to develop a more successful model for police to follow. Community policing, which attempts to form a partnership between the police and residents in the neighborhoods the officers serve, developed primarily because many people desired an improved American police force.

Early advocates of community policing identified order maintenance issues as important factors in the overall control of crime.<sup>2</sup> Reports identifying the amount of crime in the country indicated that most Americans were much more likely to encounter problems associated

with uncivil behavior than to become a victim of crime. Fear on the part of residents, however, often caused community groups to equate disorderly persons with criminal activity. Academic information supported the feeling that resident fear represented an important factor in determining police effectiveness. Thus, reducing civil disorder became a main ingredient of the emerging community policing philosophy.

Law enforcement professionals, equipped with lessons learned during the problem-laden traditional policing period and the failed team policing initiative, realized the need to work with the various communities they served to identify issues viewed by each neighborhood as significant. Traditional policing “is centered on serious crime,

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***Public support for community policing can vary depending on how an agency plans and implements the effort.***

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*Captain Allender serves with the Indianapolis, Indiana, Police Department.*

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as opposed to maintenance of community social order or general service delivery.”<sup>33</sup> Those designing community policing projects were determined to go in a different direction, but they faced many challenges. The first obstacle to overcome was formulating a definition for the concept.

### **DEFINING THE CONCEPT**

Confusion about what constituted community policing arose from the beginning. Everyone from citizens to politicians, academics, and even law enforcement managers espoused conflicting ideas of what comprised community policing. Community advocates latched onto the name and decided that it signaled a new value system in which police would become more involved with the social problems within their neighborhoods. Grant programs encouraged community policing measures that satisfied written grant requirements and attempted to meet the needs of the target area receiving funds. Grant writers, however, often failed to define what those measures entailed. Law enforcement managers began holding meetings for their rank and file sworn personnel informing them that with the advent of community policing, officers would be “empowered” to take care of problems on their beats. These managers, however, sometimes failed to

explain adequately all of the responsibilities that would accompany this policy. Uncertainty about what the program entailed hindered its implementation in the law enforcement community. Some veteran officers began to feel that community policing was just another federal program that would disappear as soon as the grant money dried up.

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***Confusion about what constituted community policing arose from the beginning.***  
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How, then, could the proponents of community policing identify the expected outcomes of the program? The common theme running through all of the definitions of community policing remains the desire to improve the quality of life for local residents. To accomplish the goals and objectives of the program, most community policing theories state that an order maintenance component must exist that targets problems specific to each community or environment.

However, coupled with order maintenance, police also must

engage in problem solving designed to deal with both the immediate situation and with the underlying causes for the problems. The general public and law enforcement must partner to identify problems and formulate solutions. The local law enforcement agency and its citizens must arrive at a consensus definition for community policing *before* they attempt its implementation. The definition needs to be flexible and subject to change as problems in the neighborhood evolve.

### **IMPLEMENTING THE STRATEGY**

Besides law enforcement officers, other components of the criminal justice system can be impacted by the implementation of a community policing strategy. Prosecutors or district attorneys need to be part of the planning process before officers bring them arrests for order maintenance concerns that otherwise might have been overlooked. Judges need to understand that cases brought before them from these areas are part of a systematic approach to alleviate problems in a targeted area. Aggressive enforcement that results in increased arrests might impact the jail because of an increased inmate population. Probation and parole officers may benefit from working with community policing officers, who could offer them a better

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understanding of problematic persons living in the area. Public defenders may encounter an increased caseload and possibly find prosecutors more resistant to plea bargaining. Officials charged with enforcing city ordinances involving zoning and housing will be asked to assist police with a variety of projects. To achieve maximum success, each component of the criminal justice system must mesh with the others and keep in mind certain influential factors, including constitutional issues, cost considerations, and the level of public support.

### **Constitutional Issues**

Constitutional issues may arise from community policing efforts. Changes in the way police enforce the law or institute new programs may give rise to challenges or complaints. Community police are encouraged to try new concepts. Whenever police enter an uncharted area, legal challenges generally result. Some issues will be decided in the favor of law enforcement, whereas others will be decided in favor of the defendants. For example, if the target area is located in a part of the city populated mostly by minorities, charges of racial profiling may result from aggressive enforcement. The law enforcement administrator charged with planning a community policing program must make every effort

to plan for and avoid legal complications, such as in the previous example wherein it may be necessary to gather statistical information on both victims and suspects. Planning will help legal advisors defend controversial efforts.



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### **Cost Considerations**

Costs associated with community policing need not be high. After all, law enforcement's single largest expenditure is officer salaries. The officers assigned to a given area can work either in the traditional mode or in a more directed manner under established community policing guidelines. Regardless of the approach, salaries will remain the same.

As a philosophy, community policing can make use of existing resources. Integration of law enforcement assets with other components of the community actually can make for a more efficient and cost-effective police agency. It is true that in the

start-up phase of the effort, the use of overtime and other grant funds can be an important way to get personnel to support the program. To continue the effort after grant funds run out, a department can tap into money that it ordinarily would budget for public relations activities, normal overtime expenditures, and officers already assigned to the neighborhood. With increased interaction with the community, officers, at the very least, will gain intelligence information that can enable them to better deal with neighborhood problems.

### **Public Support**

Public support for community policing can vary depending on how an agency plans and implements the effort. If officers work with the community to establish a mutual goal, the program probably will be accepted. In locations where officers make little or no effort to achieve a consensus of opinion, problems will arise.<sup>4</sup> Political support will come only if the residents support the concept. Civil liberties groups will monitor the effort closely to see if constitutional problems or other irregularities occur.

### **CONCLUSION**

The philosophy of community policing states that successful programs require the formation of a partnership between the police and area residents.



## ***M-A-N-A-G-E-M-E-N-T Defined Subordinates' Expectations***

By Sergeant Richard Forsyth

**M**anagement remains a much-studied subject. All organizations, from large corporations to local police departments, desire to supervise their employees as effectively as possible. Over the years, leaders have examined countless books and articles presenting both differing and evolving opinions of what constitutes effective supervision.

I believe that a particularly insightful way to look into the subject of management is to view it from the subordinate's perspective. For example, what does a sergeant expect from a lieutenant? A lieutenant from a captain? A captain from a chief? What considerations are important in the M-A-N-A-G-E-M-E-N-T of employees?<sup>1</sup>

### **M – Management**

*Management* means bringing about, accomplishing, and conducting. Effective managers “get things done” the right way. Employees want to work for such individuals. These supervisors do not rely on additional people to do their jobs. They do not allow others (e.g., elected officials, the media) to provide leadership for them, and they recognize the difference between “dumping” their work on subordinates and appropriately delegating it (to teach and improve them). They serve as examples for others to follow.

Effective managers strive to continually learn. They stay abreast of the latest trends in supervision and not just in law enforcement because, after all, the world continually changes and management styles must adjust accordingly. Successful supervisors also use the comments and criticism of others to their own benefit, thereby molding and shaping themselves into effective leaders and managers.

This knowledge helps them not only to perform their jobs competently but also to help their employees achieve success in their duties. This proves essential in today's society where an attitude of “doing more” error-free serves as the common expectation of organizations, as well as the public. In this regard, effective managers will pass on their knowledge, including their mistakes and the errors of others that they have witnessed, to subordinates. They will do their best to not allow their employees to take a negative course of action; they will help them to make the right decisions.

### **A – Accountability**

*Accountability* is important at all levels of an organization. Managers can demonstrate their willingness to be held accountable by getting out from behind their desks and becoming personally involved with their subordinates, bonding with them by speaking and listening to them, observing them, and sharing experiences. They must

*Sergeant Forsyth serves with the Buena Park, California, Police Department.*



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invest meaningful time with their employees to truly understand them and their needs.

Supervisors can demonstrate their willingness to get involved in a variety of situations. For example, my chief still goes out on patrol every now and then. He puts on his uniform, takes the stars off his collar, and partners with an officer on patrol. His actions show the entire department that he does not consider himself above doing the same work that he asks his officers to perform—and demonstrate his accountability to his employees.

### **N – Nobility**

*Nobility* means being morally sound, superior in character and nature. Subordinates want to follow managers who model such qualities. Unfortunately, in today's society, many people seem to think that two standards exist in the way people act—one for professional conduct and the other for private. For example, famous athletes or well-known politicians may want to receive judgment only on their spectacular accomplishments on the athletic field or in the political arena and to have their private affairs ignored. However, people of integrity adhere to moral principles in all activities, on or off duty. The fact is, subordinates lose respect for their managers if they see them participating in inappropriate conduct, regardless of when or where the activity takes place. Employees want to work for managers of noble character; such supervisors earn the esteem of their staffs.

### **A – Action**

*Action* defines leadership. Leaders make decisions about where they want to go, what they want to do, and how they will get there. And, they do what they said they would do. In Richard

Bach's classic book *Jonathan Livingston Seagull*, most of the seagulls did not bother to learn anything more than just the simplest facts of flight. Jonathan struggled with the decision of whether to be content to fly like the other gulls or to be different and live up to his flying potential. He decided to take action and excelled above the other gulls in the art of flying.

While it is easy to sit back and do just enough to get by, to not make waves, and to make everyone happy, it takes courage to act. Employees find it frustrating to look at a manager and see someone who will not do so. Nonaction implies that the supervisor must not care. Managers should strive to be people who act when needed, leaders who possess enough courage to change direction when warranted. Subordinates want to know that if their bosses see something that is not right, they will have the courage to speak up, to bring the issue to light, and to take action. As a famous athlete said, "You miss 100 percent of the shots you never take."<sup>2</sup> Strong leaders "take the shot." Employees want to work for such individuals.

### **G – Guiding Principle**

People generally follow a *guiding principle* that tells them to treat others as they would like to be treated. Truly, the greatest legacy a person can leave behind is to have had a positive influence on the lives of others. Supervisors can do this in three ways.

First, managers should only employ supervisory tactics that they would consider appropriate if their own bosses used them. In this regard, supervisors can evaluate their own managers and incorporate positive attributes into their own style of management while eliminating the negative.

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**All organizations...  
desire to supervise  
their employees as  
effectively as  
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Second, they should lead by example. Managers should ask employees to follow only regulations and procedures that they themselves follow. Supervisors' practices and actions should mirror agency rules and policies, as well as the types of behavior expected from subordinates.

Third, managers should treat employees with dignity, kindness, caring, and compassion. This does not mean that they must be soft but, rather, human. Subordinates respond positively to supervisors that truly respect and care about them personally and professionally. Managers can accomplish this in many ways. For example, they simply can show a genuine interest in employees' lives outside of work—areas, such as their families and hobbies. My agency has a slogan that sums this point up well: "People are our greatest asset." Supervisors should treat their subordinates accordingly.

### **E – Education**

Managers must facilitate the *education* of their employees. One method is to encourage subordinates to pursue formal college degrees. Such credentials can serve to further professionalize law enforcement in general. Also, campus settings present officers the opportunity to facilitate friendships and relationships with individuals of other professions and cultures, exposing them to different ways of thinking. This, in turn, can help them expand their outlook and better understand the diverse communities and people they serve.

Another way supervisors can help educate their employees is through formal training, such as conferences and seminars. Such opportunities should not be limited only to those relative to their specific current assignment but should

include other areas that would augment their repertoire.

Putting a priority on education shows subordinates that the manager cares about their personal progression, as well as the ever-growing and changing needs of the department. Supervisors should continually encourage their employees to take advantage of opportunities. As subordinates continue to learn, they confidently and effectively can serve the needs of the organization, as well as the community. Also, when employees feel competent and valuable, they enjoy their work. Education serves as an effective tool organizational leaders can use to better their personnel and the organization; it provides a "win-win" situation.

### **M – Mentoring**

*Mentoring* constitutes another important aspect of management. Professionally, supervisors can find many areas of their jobs that would be beneficial for their subordinates to learn. For example, sergeants can gain insight into a lieutenant's decision-

making process, lieutenants can assist with staff work usually done by captains, and captains can attend functions for chiefs of police. The best learning comes from doing. Supervisors should involve their employees where they can learn from areas of the job done by those above them. An effective manager tries to train, educate, and motivate their subordinates to one day replace them.

Many years ago, I took the promotional exam for the rank of sergeant and did not do very well. Shortly thereafter, a sergeant approached me and presented a flier announcing a seminar for officers seeking this rank. This individual even



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offered to attend with me. I remember thinking that this sergeant easily could have thrown the announcement away when he received it, thinking to himself that he already had attained this rank and did not need the seminar for his own benefit. How grateful I was that he looked upon his responsibility to mentor others. I greatly appreciated his willingness to help me in my own progression and development toward promotion.

### **E – Ethics**

As individuals who must set the example for their subordinates, managers must realize that their words, attitudes, emotions, thoughts, and actions all reveal their personal *ethics*. While nobody is perfect, supervisors are held to a higher standard. Fair or unfair, the higher individuals climb the “ladder of success,” the more people expect them to uphold the ethical standards of law enforcement.

People’s ethical standards are the written and unwritten rules that govern their personal conduct. Law enforcement officers strive to abide by the Law Enforcement Code of Ethics, which states, in part, “I will never act officiously or permit personal feelings, prejudices, political beliefs, aspirations, animosities or friendships to influence my decisions.” In other words, this simply means doing the right thing and making the right choices for the right reasons. Supervisors have an obligation to abstain from unethical behavior and to call attention to inappropriate actions when others commit them. Employees expect managers to “right the wrong,” to be just and fair in their dealings with their staffs, to demonstrate respect, to prove loyal to the organization’s mission and vision, and to

maintain subordinates’ trust by demonstrating self-discipline and consistency. Subordinates need assurance that supervisors base their actions and decisions on ethical principles.

### **N – Notice**

Managers should *notice* the quality work done by their personnel. People depend on the evaluations of others, particularly in the workplace. Supervisors can address this need by using praise often. Recognition acts as a strong motivator at work; employee job satisfaction surveys attest to this. Unfortunately, organizations often do not recognize their staffs for the superior work they do. Certainly, nobody wants to work for an agency where the boss takes credit for everything that goes right and places blame on others when things go wrong. Managers should give credit where credit is due—not doing so surely will develop disdain and resentment in the organization.

In my department, a watch commander became known for placing stickers of big red stars on officers’ reports that he deemed outstanding. While everyone initially considered it silly (reminding them of kindergarten), officers actually began working harder to write better reports, with the obvious goal of receiving a red star on their work. Recognizing someone for the valuable work they do is an easy way to develop loyalty and encourage increased productivity.

### **T – Trustworthiness**

The Boy Scouts of America follow 12 ideals that encompass their Scout Law, with the first being, “A scout is trustworthy.” *Trustworthiness* is of the utmost importance in management as

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...a particularly  
insightful way to  
look into the subject  
of management is to  
view it from the  
subordinate’s  
perspective.  
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well. A manager can develop trust at work by simply not doing anything to undermine it.

Supervisors must remain honest with their employees. Managers should treat their word as their bond; in short, they should do as they say. But also, managers must remain committed to the truth in their overall communications. They must avoid giving different versions of “the truth” to different employees or telling them only what they want to hear. Trustworthy managers always speak honestly, even when it proves unpopular.

Open communication also proves essential, creating a sense of partnership between managers and employees. Subordinates must know that they can discuss issues with an open and understanding supervisor. Also important, managers must share information with their staffs, such as important decisions facing the organization. Informed employees will trust and remain loyal to the leaders who communicate openly with them.

### Conclusion

The effective M-A-N-A-G-E-M-E-N-T of employees serves as a primary goal for any department. The subject has received much study over the years, resulting in the production of countless books and other materials presenting different views of what constitutes effective supervision of subordinates.

Agency leaders may find this topic confusing at times. Perhaps, examining it from the subordinate’s perspective can help supervisors gain insight into how they can effectively manage an organization’s greatest asset—its people. ♦

### Endnotes

<sup>1</sup> The author based this article on his professional experience and observations during his years in law enforcement.

<sup>2</sup> Wayne Gretzky; retrieved on November 12, 2003, from <http://www.dailycelebrations.com/092100.htm>.

## Wanted: Notable Speeches

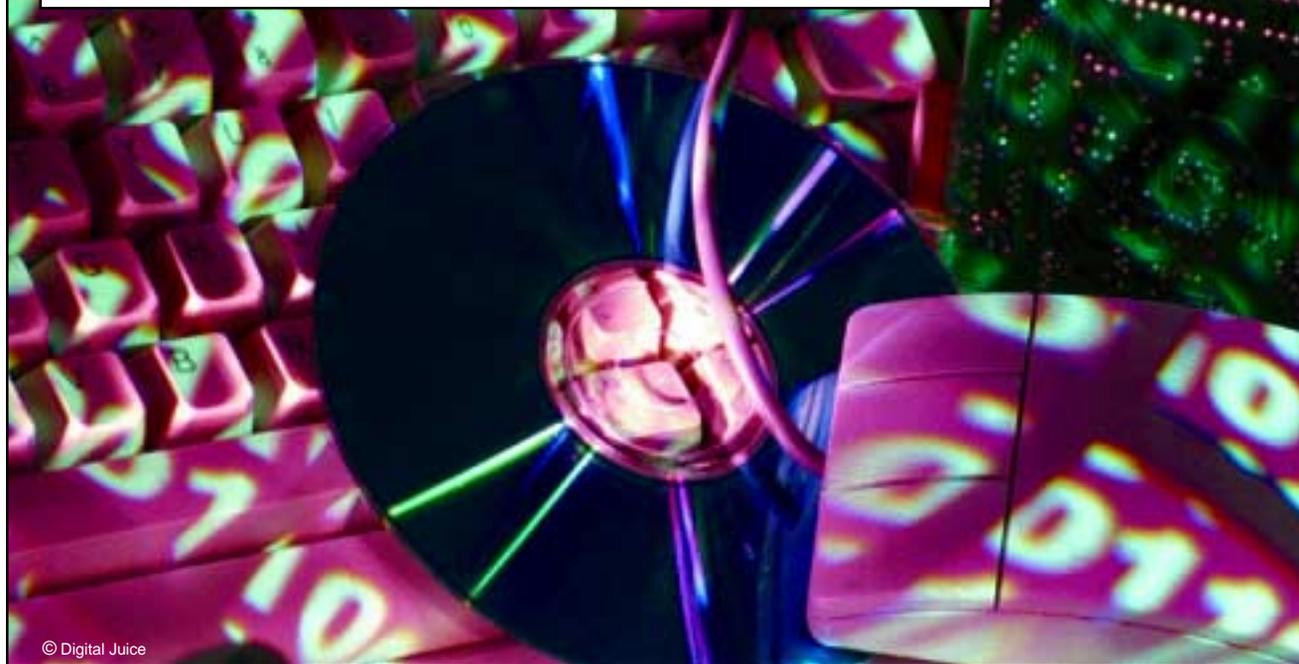
**T**he *FBI Law Enforcement Bulletin* seeks transcripts of presentations made by criminal justice professionals for its Notable Speech department. Anyone who has delivered a speech recently and would like to share the information with a wider audience may submit a transcript of the presentation to the *Bulletin* for consideration.

As with article submissions, the *Bulletin* staff will edit the speech for length and clarity, but, realizing that the information was presented orally, maintain as much of the original flavor as possible. Presenters should submit their transcripts typed and double-spaced on 8 ½- by 11-inch white paper with all pages numbered. When possible, an electronic version of the transcript saved on computer disk should accompany the document. Send the material to:

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# ***Computer Forensics*** ***Characteristics and*** ***Preservation of Digital Evidence***

By LOREN D. MERCER, M.F.S.



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**I**n San Diego County, California, forensic experts examined a laptop computer for evidence of notes used in the robbery of several local banks—a university professor later would plead guilty to bank robbery charges and receive 9 years in prison, even though the laptop contained no saved notes.<sup>1</sup> In another case, a Navy enlisted man faced a dishonorable discharge and time in the brig for possession of child pornography after the discovery of floppy disks in a backpack he inadvertently left on

a dock at muster. These cases and many more, handled by computer forensic examiners every day, have convicted scores of criminals who committed or stored information pertaining to their crimes with computers and other digital devices.<sup>2</sup> Such criminal acts now transcend traditional business crimes.

Criminals commit few crimes today without involving a computing device of some type. This puts a strain on computer forensic examiners who have the training, skills, and abilities to

properly handle digital evidence. Law enforcement agencies take different avenues of addressing this increasing load of computer evidence that requires examination to close cases. Many train a few of their law enforcement officers. Some train professional support technicians. Increasingly, agencies send their work to local or regional computer forensic laboratories. Regardless, an understanding of the proper evidentiary foundations for admission of computer-related evidence proves necessary for the

courts to have confidence in the material ultimately presented.

### Uniqueness of Computer Digital Evidence

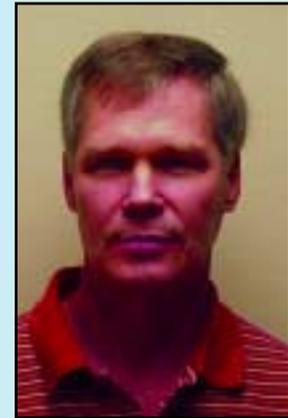
In 1948, well-known mathematician Dr. Claude Shannon outlined mathematical formulas that reduced communication processes to binary code and calculated ways to send them through communications lines.<sup>3</sup> Since then, computers and other digital computing devices have used encoding methods based on the binary numbering system.

Computers allow criminals to remain relatively anonymous and to invade the privacy and confidentiality of individuals and companies in ways not possible prior to the advent of the computer age. “Evidence of these crimes is neither physical nor human, but, if it exists, is little more than electronic impulses and programming codes.”<sup>4</sup> This evidence can take the form of data digitally stored as text files, graphics files, sounds, motion pictures, databases, temporary files, erased files, and ambient computer data dumped on the storage device by the operating system or application program. If someone opened a digital storage device, they would see no letters, numbers, or pictures on it. Therefore, “understanding how a computer stores data is basic to understanding how sensitive that data is to inadvertent contamination

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***...an understanding of the proper evidentiary foundations for admission of computer-related evidence proves necessary....***

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and how important a chain of custody becomes when testifying to the ‘originality’ of the evidence.”<sup>5</sup>

### Storage of Data

“Digital electronics involves circuits and systems in which there are only two possible states. The states are represented by two different voltage levels: a high or a low level. The two-state number system (base 2) is called binary, and its two digits are 0 and 1. A binary digit is called a bit.”<sup>6</sup> Because reading strings of zeros and ones severely limits the number of people capable of reading a digital device and to accommodate letters, punctuation, and special characters, another decimal numbering system began—the hexadecimal, or base 16,<sup>7</sup> system. The hexadecimal numbers express the binary values stored on a device. At a minimum, a truly readable

alphanumeric code must represent 10 decimal digits and 26 letters, or 36 items. However, the inclusion of punctuation, symbols, and computer control codes requires a seven-bit code (2x2x2x2x2x2x2) yielding 128 combinations, or 2<sup>7</sup>=128. The complete expression of binary information encompasses eight bits, with one sign bit and seven magnitude bits,<sup>8</sup> giving 256 possible combinations. This eight-bit binary number represents one byte. Of the alphanumeric codes, the American Standard Code for Information Interchange (ASCII) serves as the most widely used.

Although more complicated, hexadecimal numbering provides a way to input data into the computer that makes sense to the average person. After entry, computers write and read data to digital media by a “read-write” head controlled by the microprocessor. For example, a computer

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may store data as minute magnetized regions along a track of a floppy disk. Other storage devices exist that store data in a different fashion, but all read the binary data as a zero or a one.

Computer evidence has both a physical component (the storage media) and a nonphysical component (electronic impulses and magnetic orientation). By its nature, digital evidence proves susceptible to alteration, either inadvertently or purposely. "It is a product of the data stored, the application used to create and store it, and the computer system that directs these activities."<sup>9</sup>

### Preservation of Computer Forensic Evidence

Computer forensic science encompasses four key elements: identification, preservation, analysis, and presentation.<sup>10</sup> Manual handling, processing, and authenticity issues serve as the basis of the preservation aspect. Safeguards and methodologies used by computer forensic examiners must ensure the preservation of digital evidence to withstand judicial scrutiny should the matter go to trial.<sup>11</sup> In this regard, computer forensic examiners seek to use copies of images of original digital media for their investigations. This premise finds its basis in protecting original digital evidence from accidental damage or unintentional alteration, leaving

it in the best possible state for authentication purposes.<sup>12</sup>

When duplicating evidence, the original needs forensically sound handling from its initial seizure until its final disposition. This requires a chain of custody to assure proper handling by qualified individuals. Also, the duplication must produce an accurate reproduction of the original. Failure to authenticate the

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**...evidence of criminal activity...requires preservation, examination, and analysis in a forensically sound manner....**

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duplicate image or copy may invalidate any results produced. The duplication process requires the examiner to protect the original from accidental alteration and to use methods and applications that assure the duplicate image will produce output that would match output from the original. Agency standard operating procedures and policy manuals delineate methods of handling and duplicating. Failure to adhere to agency policies and procedures will cause the

courts to question the accuracy and reliability of the data, the examination process, and the examiner's "intellectual rigor."

For the admissibility of the evidence, courts require proof of its authenticity. Two recent U.S. Supreme Court cases, *Daubert vs. Merrell Dow Pharmaceuticals, Inc.*, 1993 and *Khumo Tire Co. vs. Carmichael*, 1997, have brought the standards of forensic science and expert testimony concerning admissibility of evidence into focus. The major factor that underlies the authenticity of duplicate evidence is data set validation.

The process of validating digital data sets proves straightforward. Forensic examiners use an algorithm<sup>13</sup> to create a hexadecimal numeric value representing the data set. For example, in an MD5<sup>14</sup> one-way hash<sup>15</sup> sum, a 16-character hexadecimal value is produced by the algorithm where there are 2<sup>128</sup> possible values. This equates to approximately 340 billion billion billion probable unique numbers. Theoretically, two different data set values could prove identical, but, practically, they cannot. By comparison, in cases where DNA results have identified a subject, probability tables exclude or include an individual using probabilities of one to several billion and stand accepted as unique to an individual, or a very small

population of individuals, by courts. The likelihood of two identical values happening in an MD5 algorithm proves infinitely smaller. With known and tested computer forensic tools and hash algorithms, there exists a means to duplicate and authenticate digital evidence. The duplicate's authenticity can be equated to the original.

### Federal Rules of Evidence – Original Evidence

The Federal Rules of Evidence<sup>16</sup> (FRE) cover duplicate digital evidence and its authentication. For admissibility in court, the evidence should possess a chain of custody to show that no inadvertent or purposeful contamination occurred. Preserving evidence to ensure its integrity proves important to the courts' consideration of its originality.

These rules define *original* electronic documents. FRE 1001 (1) defines writings and recordings to include magnetic, mechanical, and electronic methods of setting down letters, words, numbers, and their equivalents. FRE 1001 (3) states, "If data are stored in a computer or similar device, any printout or other output readable by sight, shown to reflect accurately, is an 'original.'"<sup>17</sup> FRE 1003 provides that "a duplicate is admissible to the same extent as an original unless (1) a genuine question is raised as to the authenticity of the

original or (2) in the circumstances it would be unfair to admit the duplicate in lieu of the original."<sup>18</sup> FRE 1001 (4) defines duplicate as "a counterpart produced by the same impression as the original... by mechanical or electronic rerecording... or by other equivalent techniques which accurately reproduces the original."<sup>19</sup> FRE 901 (a) provides that "the requirement of authentication or identification as a condition precedent to admissibility is satisfied by evidence sufficient to support a finding that the matter in question is what its proponent claims."<sup>20</sup> Example 9 of FRE 901

(b) states, "*Process or system.* Evidence describing a process or system used to produce a result and showing that the process or system produces an accurate result."<sup>21</sup> Title 42 U.S. Code, Section 2000aa-7, covers digital evidence under definition (a), "documentary materials," which states, "materials upon which information is recorded, and includes, but is not limited to... other mechanically, magnetically, or electronically recorded cards, tapes, or discs..."<sup>22</sup> Original evidence or a derivative of the original, either electronic or printed, therefore, proves admissible if

### Computer Numbering Systems

| <u>Decimal</u> | <u>Binary</u> | <u>Hexadecimal</u> |
|----------------|---------------|--------------------|
| 00             | 0000          | 0                  |
| 01             | 0001          | 1                  |
| 02             | 0010          | 2                  |
| 03             | 0011          | 3                  |
| 04             | 0100          | 4                  |
| 05             | 0101          | 5                  |
| 06             | 0110          | 6                  |
| 07             | 0111          | 7                  |
| 08             | 1000          | 8                  |
| 09             | 1001          | 9                  |
| 10             | 1010          | A                  |
| 11             | 1011          | B                  |
| 12             | 1100          | C                  |
| 13             | 1101          | D                  |
| 14             | 1110          | E                  |
| 15             | 1111          | F                  |

the handling, duplication, and authenticity provides assurance to courts that the evidence is as claimed.

## Conclusion

The computer age dramatically has changed how people relate to each other, but not their basic human nature. A minority of individuals who believe there exists a shortcut to riches, or who invade the privacy or innocence of others, continue to carry out their criminal agendas. However, now they more likely use a computer or other digital device to store information about their actions or to commit their crimes.

Law enforcement agencies recognize that digital devices will increase in use in the commission of crimes and that human and equipment resources to examine this evidence will prove an expanding department budgetary item. Agencies that employ or use computer forensic laboratory resources must recognize that computer forensic examiners need to 1) adhere to a set of scientific standards that include a chain of custody policy encompassing the unique nature of digital evidence, 2) use standard operating procedures that assure known results from duplication and authentication, and 3) follow policies that meet standards of forensic science and expert witness testimony as promulgated by the courts.

The ultimate goal of law enforcement has not changed, but crimes are committed in new ways. To preserve the freedoms all Americans enjoy, evidence of criminal activity still requires preservation, examination, and analysis in a forensically sound manner to show the innocence or guilt of a suspect. ♦

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## Endnotes

<sup>1</sup> Kathryn Balint, “Computers May Reveal Secrets Behind Crimes”; retrieved on July 23, 2003, from [http://www.signonsandiego.com/news/metro/santana/20010312-9999\\_1n12compute.html](http://www.signonsandiego.com/news/metro/santana/20010312-9999_1n12compute.html).

<sup>2</sup> The author based this article largely on his research on and experience with the subject of computer forensics. Law enforcement agencies should refer to appropriate legal guidelines applicable to their jurisdictions.

<sup>3</sup> Loring Wirbel, “Comms Pioneer Claude Shannon Dead at 84”; retrieved on July 23, 2003, from <http://www.eetimes.com/story/OEG20010227S0045>.

<sup>4</sup> David Carter and Andra Katz, “Computer Crime: An Emerging Challenge for Law Enforcement”; retrieved on July 23, 2003, from <http://www.sgrm.com/art11.htm>.

<sup>5</sup> Loren Mercer, “Chain of Custody Issues Regarding the Handling of Digital Evidence” (masters thesis, National University, 2001).

<sup>6</sup> Thomas Floyd, *Digital Fundamentals* (New York, NY: Merrill, 1990).

<sup>7</sup> The term *base* describes the number of digits used in a particular numbering system. For instance, the decimal numbering system is a base-10 system.

<sup>8</sup> For further information, see [http://www.geocities.com/regia\\_me/sig-mag.htm](http://www.geocities.com/regia_me/sig-mag.htm), accessed on July 23, 2003.

<sup>9</sup> Michael Noblett, Mark Pollitt, and Lawrence Presley, “Recovering and Examining Computer Forensic Evidence,” *Forensic Science Communications* 2, no. 4 (2000); retrieved on July 23, 2003, from <http://www.fbi.gov/hq/lab/fsc/backissu/oct2000/computer.htm>.

<sup>10</sup> Rodney McKemish, “What Is Forensic Computing,” *Australian Institute of Criminology—Trends and Issues in Criminal Justice* (June 1999): 1-6; retrieved on July 23, 2003, from <http://www.aic.gov.au/publications/tandi/ti118.pdf>.

<sup>11</sup> J. Borck, “Leave the Cybersleuthing to the Experts,” *InfoWorld* 23, no. 54 (2001).

<sup>12</sup> *Supra* note 9.

<sup>13</sup> A formula or set of steps for solving a particular problem.

<sup>14</sup> For further information, see [www.permissiontechnology.com/md\\_5\\_hash\\_resources.htm](http://www.permissiontechnology.com/md_5_hash_resources.htm), accessed on July 15, 2003.

<sup>15</sup> For further information, see [www.rsasecurity.com/rsalabs/faq/2-1-6.html](http://www.rsasecurity.com/rsalabs/faq/2-1-6.html), accessed on July 15, 2003.

<sup>16</sup> Federal Rules of Evidence; retrieved on July 23, 2003, from <http://www.law.cornell.edu/rules/fre/overview.html>.

<sup>17</sup> *Ibid.*

<sup>18</sup> *Ibid.*

<sup>19</sup> *Ibid.*

<sup>20</sup> *Ibid.*

<sup>21</sup> *Ibid.*

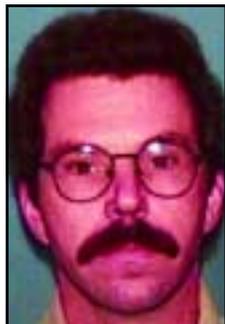
<sup>22</sup> 42 U.S.C. § 2000aa-7.

## The Bulletin Notes

Law enforcement officers are challenged daily in the performance of their duties; they face each challenge freely and unselfishly while answering the call to duty. In certain instances, their actions warrant special attention from their respective departments. The *Bulletin* also wants to recognize those situations that transcend the normal rigors of the law enforcement profession.



Officer Cooper



Officer Ribich

While on mobile patrol, Officers Rickard Cooper and Gary Ribich of the Cleveland Clinic Foundation, Ohio, Police Department came upon a crash involving a medical helicopter. As they approached the scene, a man with his clothes on fire ran frantically toward them from the crash site. As Officer Ribich retrieved the fire extinguisher from the police vehicle, Officer Cooper rushed to the individual's aid, instructing him to drop and roll. The officers were able to extinguish the flames. Officer Cooper then noticed a stream of fuel moving along the ground from the crash site toward the officers and their vehicle. As Officer Cooper began running to move the vehicle and Officer Ribich started to pull the man to safety, a loud explosion occurred, propelling Officer Ribich and the victim a short distance away and rocking Officer Cooper. Both officers suffered some temporary hearing loss and Officer Ribich sustained minor leg injuries. Because of the quick thinking and actions of these officers, the victim became the only survivor of a crew of three aboard the helicopter.



Officer Shepard

Early one morning while on patrol, Officer William Shepard of the Des Moines, Washington, Police Department detected the odor of smoke in the air. Immediately, Officer Shepard began searching the area for the source of the smoke and noticed a local motel, at near capacity, on fire. Quickly, Officer Shepard requested the aid of fire department personnel and then awoke and evacuated all occupants room-by-room. The individual in the room where the fire originated already was suffering from smoke inhalation. Officer Shepard's prompt and professional response to this crisis saved many lives.

Nominations for the *Bulletin Notes* should be based on either the rescue of one or more citizens or arrest(s) made at unusual risk to an officer's safety. Submissions should include a short write-up (maximum of 250 words), a separate photograph of each nominee, and a letter from the department's ranking officer endorsing the nomination. Submissions should be sent to the Editor, *FBI Law Enforcement Bulletin*, FBI Academy, Madison Building, Room 209, Quantico, VA 22135.

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## Patch Call



The patch of the Fayette, Alabama, Police Department features an eagle, symbolizing strength and justice through law and order, sitting atop the city's shield, which is framed by the flags of the United States and the state of Alabama. The shield features the year of Fayette's incorporation, 1821, along with the cotton bowl, representing agriculture; the wheel, depicting industry; and the lamp, symbolizing education.



The patch of the Hampstead, Maryland, Police Department displays the town train station, which serviced passengers traveling between Baltimore and Hanover, Pennsylvania. The station, built in 1912 and operational until 1969, still stands and is currently under renovation to serve as a museum and visitor center.