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THE VALUE OF MEDICOLEGAL AUTOPSY TO THE ARSON AND CRIMINAL INVESTIGATOR

William E. Kirwan

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There are several different kinds of death; causes of which can be by a direct or indirect act, by omission or failure to perform certain acts. Death can be:

1. Accidental—which are usually violent.
 2. Homicidal—caused by the act or omission of another person.
 3. Suicidal—caused by the subjects themselves.
 4. Natural—usually occurring after a period of illness or complaint.
- The thing or principle that distinguishes these deaths is the "cause."

However, it is extremely difficult to establish the cause of death in all instances. Can anyone set himself as an infallible authority? The foremost pathologists would not assume that responsibility. Coroners, medical examiners, experienced homicide detectives, would they? Some have tried—but those who have, found that they need the assistance of others. The complete exploration into cause of death, especially in crime investigation requires more than one hand.

Do you know that in this country some 300,000 deaths are reported from obscure, suspicious, criminal, or violent causes—one out of every 5 deaths. Of this huge number 13,000 are officially recognized as murder; one murder per year for every 10,000 persons. How many other thousand murders are committed unrecognized or unsolved, especially through fires.

These statistics should make us question closely the ability, fitness, and training of those to whom we entrust the responsibility of investigation. Obscure, violent, or suspicious deaths must be thoroughly investigated; not only to determine cause of death, but to protect the suspect's life, liberty, and reputation. Remember that in every murder case the defendant's life is in the hands of the investigator.

It can be shown by statistics that where a thorough and competent investigation has been made, between 10 and 20 percent of all murders were cases of death unwitnessed and without external marks of violence. These are the cases so often reported as cardiac failure, acute

indigestion, alcoholic intoxication, drowning, fires, or automobile accident. A misleading interpretation is too often given by our coroners or even by members of our own profession.

Even after the most thorough autopsy, toxicology, bacteriology, and other investigations there still remains 10 to 15 percent of deaths, the cause of which cannot be explained.

Whenever death occurs during a fire, it is of the utmost importance to determine both the cause of death and the cause of the fire. If the cause of death is proven to be murder, then it is a good indication the fire was of incendiary origin and probably for the purpose of concealing a crime.

Experience has taught us that the burning of a building and the finding of a body does not necessarily mean that the body is the owner of the building nor the occupant of the premises, nor does it mean that death occurred as a result of the fire. We have had enough experience with insurance fraud and murder to know that we must be especially suspicious under such circumstances.

The identity of a deceased person in homicide investigations is of extreme importance. There is the problem of insurance payment, dissolution of business associations and partnerships, question of remarriage of survivors, probate of wills and estates. Then, too, identification is necessary to forestall fraudulent attempts to collect insurance, false claims of death to guard against the desire of some persons to disappear and as a necessary step in prosecution of homicide. Sometimes identification of the deceased can be established by autopsy; e.g. the Texas City disaster, the Noronic disaster in Toronto, Canada, and the Coconut Grove fire at Boston, Massachusetts.

We all realize that the crime of arson usually involves the burning of a building or material property—a monetary loss. It is not too great a problem, this loss of money. Occasionally and perhaps too frequently, human life is lost in a fire. Most of these losses are quite accidental; nevertheless the loss of a human life is a serious social problem. No amount of insurance nor kind words in eulogy will replace this life. It is a commodity not like a building nor material property.

In some major accident cases, they take particular pains in an effort to establish that death was not accidental so that they can save themselves the double indemnity payments, but look how many cases of death occur in which the insurance company pays off without too much question, basing most of their confidence upon the doctor who signed the death certificate. How many times has a doctor signed a death certifi-

cate when he had not the slightest inkling as to the cause of death. He presumes it to be pneumonia or some other respiratory ailment, consequently signs the certificate accordingly. The person could easily have been poisoned or could have died from some obscure organic disease—then, too, how easy is it for the doctor to commit fraud by covering up the exact cause of death—how many cases of suicide are actually listed as natural causes of death. The doctor is motivated in these cases by a feeling of sympathy towards his patient, close friendship, and in some instances, fraud.

Any one who has investigated any series of original records becomes impressed with the frequency with which causes of death are inaccurately certified. After the most exhaustive investigation by competent experts, the cause of death will frequently, in any large medicolegal jurisdiction, be honestly recorded as undetermined.

This does not mean that every case of death should be investigated with the same degree of intensity—there is not enough qualified personnel available to perform such a gigantic task, but it certainly would be wise that where investigation is made that the investigation be conducted by qualified people.

How many deaths that occur through fires are actually murders? There are no definite statistics available. However, just recently Fire Marshal Scott of New York City reported before the New York State Chiefs of Police Convention, New York City: "It seems that more than ever, arson is being used to conceal a previous crime, particularly burglary, assault, and murder. About two years ago five persons were arrested for murder by arson within one year in New York City. This was the greatest number of murder by arson cases in more than 20 years. Two of these incendiary fires were set to conceal murderous attacks upon the victim."

The investigation of unexplained and violent death has five objectives:

1. Protection of the innocent.
2. Recognition of murder.
3. Documentation of accurate, unbiased evidence for civil and criminal courts.
4. Protection against public health hazards.
5. Protection against industrial hazards.

Beyond doubt exoneration of the innocent is the most important function of medicolegal or criminal investigation.

In the investigation of unexplained death, autopsy becomes necessary. Autopsy must be performed by a person competent in the field of hospital pathology as well as knowing the objectives of medicolegal autopsy. The pathologist must be on the alert to gather evidence bearing on:

1. Identification of the dead person.
2. Time and place of death.
3. Cause of death.
4. Circumstances and manner in which fatal injury or injuries were received.
5. Identity of the weapon, instrument, or person responsible for the death.

Before autopsy becomes possible, the body must be found. In all cases of homicide there are several important things to remember—whether it be death caused during a fire or from any other cause. The location of the body must be carefully noted and photographed and care must be taken in securing any evidence. Fragmentary human remains and all personal property found near, in, on, or about the body are important pieces of evidence, and must be secured. However, since this is a discussion of the value of autopsy, let us consider those facts that the dead body will reveal.

IDENTIFICATION

As to the identification of the deceased, any proper autopsy will reveal the following:

Weight—By actual calculation if you have a complete body or calculated from portions of the body.

Age—Determined by observation or by calculation from bond measurements and examination.

Height—By direct measurement or calculated from bond length.

Color of skin or race—Such is usually determined by observation.

Sex—Obvious by observation or examination of internal organs such as uterus or from bond study.

Color of hair.

Color of eyes.

Physical deformities such as old fractures or lesions determined by X-ray and check against medical records.

Dental characteristics—A dental chart can be compiled and checked against existing dental records.

Possible occupation—Some occupations produce body changes such as the teeth of the cobbler accustomed to holding nails in his teeth, or in certain trades where hands become heavily calloused.

Unusual characteristics—Tattoo marks, operation scars, hypodermic needle punctures, etc.

Clothing or jewelry attached to the body—Cleaners and laundry marks, jewelers marks, engravings, labels in clothing, personal papers (be extremely careful of passing identification on papers present on the body alone—always corroborate such evidence by other investigation), type color and fiber analyses of clothing.

X-ray.

Fingerprints.

Even though the body may be badly decomposed or severely damaged by burning, a good autopsy may reveal important facts based upon results of the above described examination.

TIME AND PLACE OF DEATH

Rigor Mortis—Rigor mortis, under normal conditions, commences from three to five hours after death. Starts in the jaw and progresses toward the lower extremities. After about 48 hours it leaves the body in the same process. Not definite.

Post Mortem lividity—This is the discoloration of the body which is caused by the settling of blood towards the lower portions (due to gravity). It usually starts about two hours after life leaves the body and is completed in approximately three to four hours. It is important to observe post-mortem lividity because it may indicate that a body had been moved after death.

Degree of decomposition—Certain atmospheres and conditions are conducive to rapid decomposition; expert autopsy with full recognition of the physical conditions of the place of death may reveal some information as to the time of death.

Insect growth—The stage of developments of certain insects and bugs found present on a decomposed body may give information as to approximate time of death.

Examination of stomach contents—Careful examination of the stomach contents will reveal the nature of the last meal which may indicate

where the last meal was taken. The degree of digestion can show the time that has elapsed since partaking of the last meal. For example, it is reasonable to presume that spaghetti and meat balls would not indicate a German Hofbrau. The type of the food can sometimes be very suggestive as to the type of restaurant.

Blood for alcohol—Chemical analysis of the blood for alcohol will show the degree of intoxication. The presence of alcohol coupled with the knowledge obtained from examination of stomach contents, can possibly indicate the type of restaurant or the place where the last meal was taken.

Foreign matter found present on the body or in the fingernails—Such as sand, pine needles, wood splinters, etc., may indicate the place where the deceased had been.

Temperature of the body—Past experience indicates that the temperature of a dead body drops about two to three degrees per hour for the first two or three hours, and thereafter at a rate of approximately one to two degrees per hour until equilibrium is reached with the environment temperature. Obviously there are exceptions to this rule so expert examination becomes necessary.

Blood stains—The absence of shed blood may indicate that injury was caused at a place other than where the body was found.

Again, even when the body is badly burned, some or all of the facts as described above can be observed and studied and valuable deductions made.

CAUSE OF DEATH

The exact cause of death may be revealed by autopsy alone.

Death is of organic or natural cause—Cardiac failure, brain hemorrhages, respiratory ailments, all of which is easily observed at autopsy.

Chemical cause of death—Obviously chemical poisonings, such as those caused by corrosives and certain other chemicals such as phosphorus, cyanides, and paraldehydes, which can usually be detected by their strong characteristic odors.

Obscure chemical causes—Usually show negative pathology, i.e., no changes in the tissues. These are cases of barbiturates, alkaloids of glucoside poisonings; certain metals do not produce characteristic tissue changes. In these cases toxicology is required.

Traumatic or violent injury—Here autopsy reveals severe fractures of the skull; severe bleedings; severe crushing of organs such as liver, spleen, and other soft tissues.

Suffocation or asphyxia—This is sometimes indicated by a peculiar discoloration of the body. The cause of death in gas poisonings can be easily detected by blood analysis. It is interesting to note that when a body is destroyed by fire, the heart is usually the last of the organs to be destroyed, and by recovering the heart we can usually recover a small quantity of blood which is sufficient for analytical purposes. It is wise to conduct blood analysis of the bodies found at the scenes of fire, whether a crime is suspected or otherwise.

The presence of carbon monoxide in the blood of a dead body is of the highest importance. It has been found that carbon monoxide will not be absorbed into the blood of a dead person. Dr. Gettler, one of the foremost toxicologists of the United States, experimented by passing illuminating gas through closed containers holding dead bodies. The subsequent blood analysis did not show any carbon monoxide content. This means that if carbon monoxide is found present in the blood of the deceased, then the deceased was alive at the time the fire occurred. Fires produce quantities of carbon monoxide gas, usually caused by incomplete combustion and a living person will inhale a goodly quantity of the carbon monoxide. On the other hand, if a person is dead before the fire occurs, then no carbon monoxide will be found present. Obviously if the person was dead before the fire started, it could indicate murder with subsequent burning to conceal the crime of murder.

Death caused by weapons such as guns, knives, and bludgeons—The results of these instruments are usually easily observed by careful autopsy.

Bacteriological causes of death such as those produced by infectious diseases, e.g., pulmonary tuberculosis, diphtheria, etc.

CIRCUMSTANCES AND MANNER IN WHICH FATAL INJURY WAS RECEIVED

Defense wounds—Observation as to the presence of possible defense wounds which will be found in the form of cuts on the back of the wrists or forearms inflicted when a person defends himself against a stabbing attack.

Hesitation marks—Usually found on the throat of persons committing suicide.

Blood alcohol content—If you find by chemical analysis that a person was intoxicated at the time of death, this may be a possible explanation

of an obscure accident or of the abnormal behavior of the person just prior to death.

Carbon Monoxide Analysis of the Blood, just mentioned.

Presence of powder residues, which will be described in the next section.

IDENTITY OF WEAPONS, INSTRUMENTS, OR THE CRIMINAL CAUSING THE DEATH

Firearms—Caliber may be determined by examination of the holes in the skin, skull, or clothing.

Type of powder—Black powder and smokeless powder residues are different in nature and appearance and can be identified by microscopic and chemical examinations.

Distances—The distance at which a fatal shot was fired can sometimes be determined by the powder pattern or powder tattooing present on the clothing or skin of the deceased. Whenever such conditions are observed they must be measured and photographed so that test can be made with suspected weapon. When such tests are made, identical ammunition as that used to cause the death must be used for test purposes. Shotgun pellet patterns are also important because they too will give an approximation of the distance at which a shotgun was fired.

Angle—The angle of penetration of a projectile through the body is important as it can indicate the position of the body at the time the shot was fired or will give information as to trajectory of bullets or projectiles.

Knives or cutting instruments—The width and length of a blade can be determined by measurement and close examination of the cut in the clothing or in the skin of the deceased. The type of instrument can be determined from the type of wound. Knives, cleavers, ice picks, and other sharp instruments produce their own characteristic cuts.

Bludgeon—The general shape of a blunt instrument reflects itself in the injury caused to the person. Hammers, whether they be ball peen or carpenters' hammers, pipes, boards, blackjacks, produce their own characteristic injuries.

IDENTITY OF THE CRIMINAL MAY BE ESTABLISHED

1. Fingerprints on weapons found at the scene.
2. Firearms tests of bullets removed from the body of the deceased, or shells found at the scene compared with suspected firearms.

3. Hair from the victim adhering to clothing of the suspect.
4. Blood stains on the clothing of the suspect, obtained when he came in close contact with the victim.
5. Foreign clothing fibers adhering to the clothing of the suspect.
6. Fingernail scrapings of the dead person can reveal the presence of skin, blood, and clothing fragments.

One important thing to always remember is that the investigator whether he be the pathologist performing the autopsy, or the police officer assigned to the investigation, should carefully mark, identify, and preserve any piece of evidence that he finds or receives in the course of the investigation. We cannot overemphasize that point. If the pathologist removes a bullet from the body of a deceased person, he should mark that bullet so that he can identify it at a later date. In homicide investigations, we find that there may be a long lapse of time between the actual commission of the crime and the prosecution of the criminal. One unforgettable case involved a shooting in 1936. This man was shot five times and was dumped in front of a hospital. He crawled into the hospital where some attempt was made to give him proper medical attention. The nurses undressed him and put his clothing in a corner. Despite medical efforts he died on the operating table. Autopsy was performed by a very competent medicolegal pathologist. The bullets were removed, marked by the pathologist with his initials and turned over to the firearms expert. The investigation of this case dragged on for six years and was finally brought to trial. During the trial the nurses were shown the clothing of the deceased, and not one of them could make positive identification because nobody had marked the evidence. As to the five bullets, the pathologist was shown these bullets and asked if he could positively identify them and he said no. After his testimony had been completed he was reminded that the initials on the base of the bullets were put there by him. He said "I saw those initials on the bullets when I was testifying and I wondered what they meant." Needless to say the case was thrown out of court because the State could not properly introduce the evidence which was so vital for conviction.

What we have been discussing are by no means all the facts that can be revealed by proper autopsy and other examinations. But at least we can now more readily understand the importance of conducting a proper autopsy.