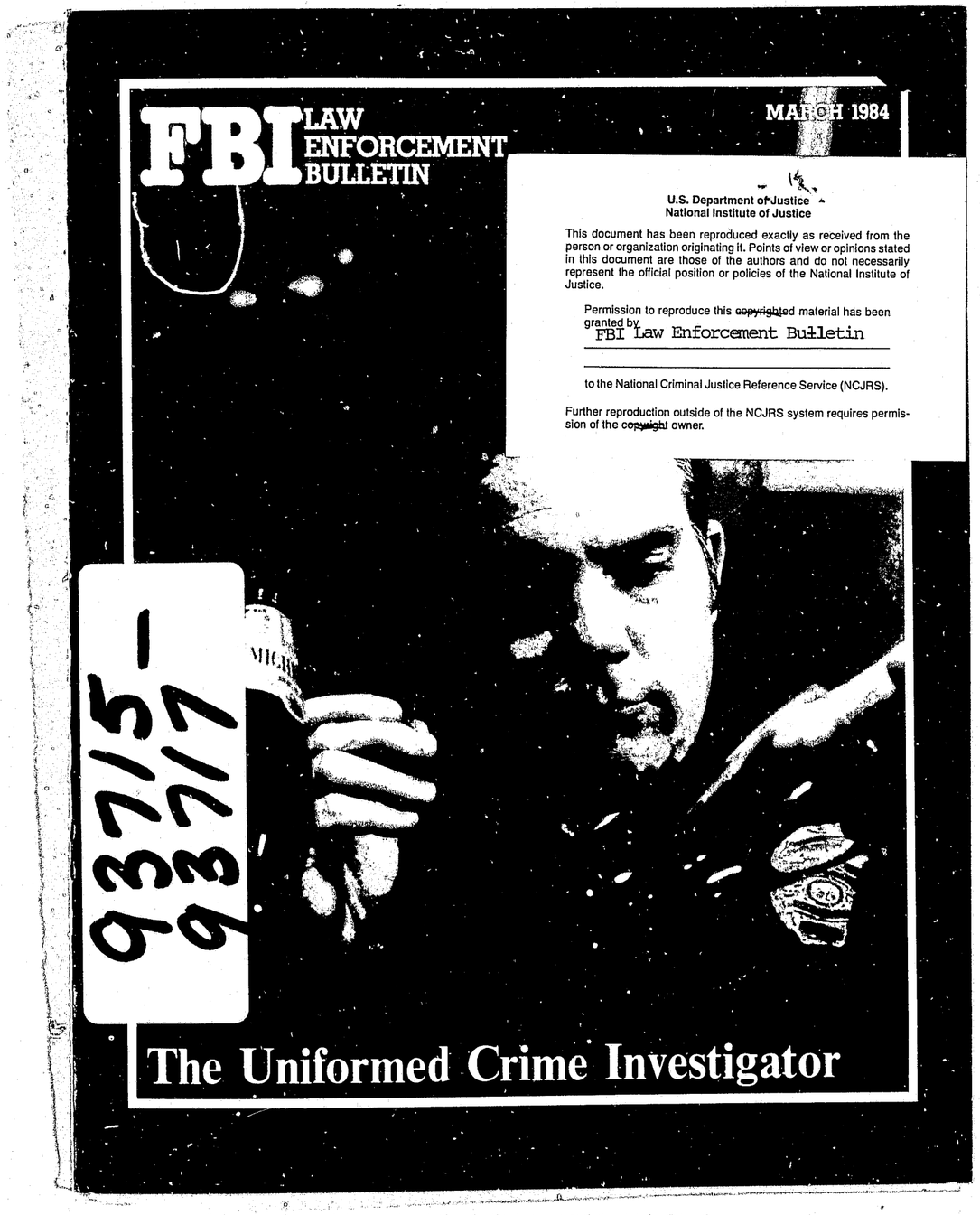


FBI LAW ENFORCEMENT BULLETIN

MARCH 1984, VOLUME 53, NUMBER 3

Contents

The Cover: As a means to control rising crime rates and provide improved service to the community, one police agency developed a Uniformed Crime Investigator Program. See article p. 1.

Federal Bureau of Investigation
United States Department of Justice
Washington, D.C. 20535

William H. Webster, Director

The Attorney General has determined that the publication of this periodical is necessary in the transaction of the public business required by law of the Department of Justice. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through June 6, 1988.

Published by the Office of Congressional and Public Affairs,
William M. Baker, *Assistant Director*

Editor—Thomas J. Deakin
Assistant Editor—Kathryn E. Sulewski
Art Director—Kevin J. Mulholland
Writer/Editor—Karen McCarron
Production Manager—Jeffrey L. Summers
Reprints—Marlethia S. Black

ISSN 0014-5688 USPS 383-310

How can my organization be more productive and cost-effective using existing manpower and equipment with minimal funding? This question is constantly on the minds of progressive law enforcement administrators. Historically, the prevailing tendency was simply to ask for additional funds to support added personnel or equipment. Administrators were not always forced to look within themselves to find solutions to field operational problems. However, State propositions and recent government financial problems have changed all of this. Law enforcement agencies are now required to continue a high level of service, maintain top productivity, and create programs to reduce crime statistics, while remaining within rollover or reduced budgets.

Crime within a community is a primary concern of all citizens, but especially to law enforcement personnel and city administrators. Aware of general crime statistics and crime clearance rates, the Oceanside, Calif., Police Department was not able to state with confidence whether our preventive efforts were productive. Although the crime clearance statistics change from month to month and year to year, the fluctuating base line

The Uniformed Crime Investigator
A Unique Strategy to Protect and Serve

By
LT. GENE N. BERRY
Commander
Operations Bureau
Police Department
Oceanside, Calif.

"Cooperation and coordination are main ingredients to the success of the program."

Fiber Evidence and the Wayne Williams Trial (Part I)

By
HAROLD A. DEADMAN
Special Agent
Microscopic Analysis Unit
Laboratory Division
Federal Bureau of Investigation
Washington, D.C.

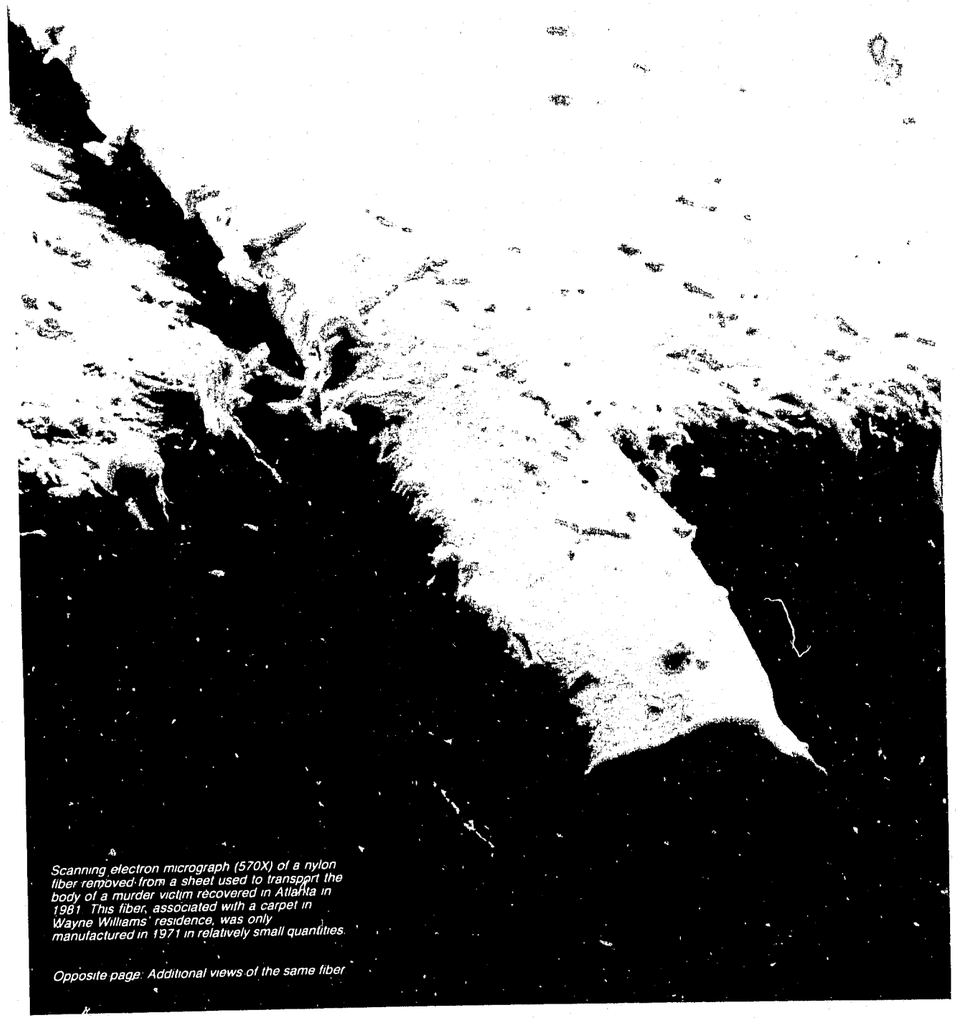
On February 26, 1982, a Fulton County, Ga., Superior Court jury returned a verdict of "guilty as charged" on two counts of murder brought against Wayne Bertram Williams by a Fulton County grand jury in July 1981. Williams had been on trial since December 28, 1981, for the asphyxial murders of Nathaniel Cater and Jimmy Payne in April and May of 1981. During the 8-week trial, evidence linking Williams to those murders and to the murders of 10 other boys or young men was introduced.

An essential part of this case, presented by the Fulton County District Attorney's Office, involved the association of fibrous debris removed from the bodies of 12 murder victims with objects from the everyday environment of Williams.

Fiber evidence has often been an important part of criminal cases, but the Williams trial differed from other cases in several respects. Fiber evidence has not played a significant role in any case involving a large number of murder victims. The victims whose deaths were charged to Williams were 2 of 30 black children and black young men who were reported missing or who had died under suspicious circumstances in the Atlanta area over a 22-month period beginning in July 1979. During the trial, fiber evidence was used to associate Williams with 12 of those victims.

Fiber evidence is often used to corroborate other evidence in a case—it is used to support other testimony and validate other evidence presented at a trial. This was not the situation in the Williams trial. Other evidence and other aspects of the trial were important but were used to support and complement the fiber evidence, not the usual order of things. The "hair and fiber matches" between Williams' environment and 11 of the 12 murder victims discussed at the trial were so significant that in the author's opinion, these victims were positively linked to both the residence and automobiles that were a major part of the world of Wayne Williams.

Another difference between this case and most other cases was the extremely large amount of publicity surrounding both the investigation of the missing and murdered children and the arrest and subsequent trial of Williams. Few other murder trials have received the attention that the Williams case received.



Scanning electron micrograph (570X) of a nylon fiber removed from a sheet used to transport the body of a murder victim recovered in Atlanta in 1981. This fiber, associated with a carpet in Wayne Williams' residence, was only manufactured in 1971 in relatively small quantities.

Opposite page: Additional views of the same fiber

Special Agent Deadman

Because of the extensive publicity and because the fiber evidence was so important, many questions about the significance of fiber evidence were brought to the attention of the public. There was considerable speculation concerning the fiber evidence. Questions concerning the meaning of a "fiber match" and about the proper procedures and techniques to be used in the characterizations and comparisons of textile fibers were discussed in newspapers and magazines.

Much of the pretrial speculation concerning the value of fiber evidence was negative. Comments such as "Fiber evidence just isn't reliable at all" and ". . . defense lawyers expressed skepticism about the legal impact of fiber evidence . . ." were published in the press.[1] There was also skepticism within the law enforcement community as to the meaning of the fiber findings, especially prior to Williams becoming a suspect. This skepticism was somewhat surprising because, as noted earlier, the introduction of fiber evidence at a criminal trial in order to link or associate a suspect with a victim or a suspect (or victim) with a crime scene is not new.

The FBI has conducted hair and fiber examinations and comparisons routinely for over 30 years at its Washington, D.C., Laboratory. Ten examiners in the Microscopic Analysis Unit of the FBI Laboratory work full time conducting these hair and fiber examinations for any law enforcement agency in the United States. In fiscal year 1981, these examiners conducted 43,043 examinations in 2,300 cases. During that time, they made 156 testimony trips to city, county, State and/or Federal courts. Many other laboratory systems worldwide routinely conduct hair and/or fiber examinations.

Why, then, should there have been this negative speculation about fiber evidence? Why is it that fiber examinations and their results have not been given the importance afforded other types of physical evidence?

This article presents the importance of forensic fiber examinations. It is a nontechnical overview of this field, discussing many aspects of a forensic fiber examination. Evidence presented at the Williams trial and testimony concerning this evidence are used to illustrate both the importance and use of fiber evidence in a trial situation. Many of the arguments discussed in this article were used to justify conclusions at the Williams trial and can be applied to fiber evidence in other trials. Problems and misconceptions concerning fiber examinations will also be addressed.

It is often difficult to get an accurate picture from press reports of the physical evidence introduced at a trial and the significance of that evidence. This article will also set forth in some detail the fiber evidence that linked Williams to the murder victims.

By discussing only the fiber evidence introduced at the trial, many other aspects of the case against Williams are being neglected. Additional evidence dealing with Williams' motivations—his character and behavior, his association with several of the victims by eyewitness accounts, and his link to a victim recovered from a river in Atlanta—was also essential to the case.

Fibers in the Environment

Many objects in our environment—clothing, ropes, rugs, blankets, etc.—are composed of yarns made of textile fibers. A textile fiber, defined as the smallest part of a textile material, can be classified into one of four categories.

The animal fiber category includes wool (hairs) from sheep, cashmere hairs from the Kashmir goat, and silk fibers (filaments) from silkworms, to mention a few. Silk fibers and animal hairs other than wool are seldom used. Even woolen fibers currently occupy less than 1 percent of all fibers used in the production of textile materials in the United States.[2]

Of the many fibers in the vegetable fiber category, only the cotton fiber is found to any large extent in items of clothing. Approximately 24 percent of the total United States textile fiber production in 1979 was cotton.[3] Other plant fibers, such as jute and sisal, are used primarily for industrial purposes and are seen in various types of cordage and baggings.

Asbestos fibers are the only natural fibers found in the mineral fiber category. Seldom used in items of clothing or household objects, they are rarely found in either the composition of or the debris from items received in crime laboratories.

The majority of fibers seen in U.S. crime laboratories are from the manmade fiber type category. Manmade fibers represent approximately 75 percent of the total textile fiber production in the United States. Those seen most often include acetate, rayon, nylon, acrylic, polyester, and olefin fibers. These are 6 of the 21 generic classifications that have been established by the U.S. Federal Trade Commission to include all manufactured textile fibers. It is important to emphasize that even when considering only these six common classifications, there is an extremely large number of different "fiber types" produced by the many fiber producers throughout the world. A manmade fiber type can be defined as a fiber of a particular chemical composition that has been manufactured into a particular shape and size, contains a certain amount of various additives, and has been processed in a particular way. Within these six common generic classifications, there are well over a 1,000 different fiber types, each differing from the other in one or more of the above-mentioned variations. Therefore, numerous fiber types can be present in the composition of textile materials. This is true even before considering differences in color.

Fibers and the Crime Laboratory

Why is the crime laboratory interested in textile fibers? In 1928, Edmond Locard first published his ideas concerning the transference of trace materials resulting from contact between people and objects. The exchange principle of Locard may be briefly summarized as follows: "When any two objects come into contact, there is always a transfer of material from each object on to the other."[4] Certainly, this is valid with many types of textile materials because of the ease with which fibers can be both lost (shed) and picked up. Since all people are closely associated with items containing fibrous materials, e.g., in their houses, automobiles, and on their person, the transference of textile fibers comes into play in many different types of criminal activity, especially in crimes of violence. When it is important to show that contact has taken place, textile fiber evidence can be invaluable.

Though fibers would seem to offer a wealth of evidence, their importance is often not fully appreciated, and sometimes, they are not even collected in criminal cases. There are several reasons for the general "low regard" attributed to fiber evidence, as compared to other types of physical evidence. In most cases, fibers are small in size and are often not easily seen or detected with the naked eye. They can be easily overlooked by someone not specifically looking for them. Even if crime scene investigators were aware of the presence of fibrous materials, special precautions to locate and preserve them are often necessary.

The small size of textile fibers should not be a problem to the investigator during evidence collection. The actual recovery of fibers from an object can be accomplished in the laboratory if the object is handled properly by crime scene personnel.

It should be noted that the size of fibers, as well as other features, such as the ease of transfer, actually benefit the investigator because perpetrators of crimes are not aware that they have been left behind or picked up evidence. Even if one were aware of fibrous materials being transferred, their small size would normally prevent one from doing anything about it.

A more serious problem is the lack of understanding about the significance of an association based upon a fiber match. Often, fiber evidence is dismissed in the courtroom as being meaningless by defense attorneys and defense experts. The degree of the significance of a fiber match, therefore, is of primary concern to prosecutors and investigators, as well as to those forensic scientists having little experience in fiber comparisons.

Figure 1

MICROSCOPICAL CHARACTERISTICS EXHIBITED BY TEXTILE FIBERS

1– COLOR
2– SIZE (Diameter, coarseness)
3– SHAPE (Cross section)
4– FIBER OR YARN PROCESSING
5– FIBER INCLUSIONS
  (A) Voids
  (B) Delustering agent
    a- Size
    b- Shape
    c- Concentration
    d- Distribution
6– SURFACE CHARACTERISTICS
7– SURFACE DEBRIS
8– DAMAGE
9– VARIATIONS IN ABOVE CHARACTERISTICS WITHIN A FIBER

Figure 2

OPTICAL PROPERTIES OF TEXTILE FIBERS

1– ISOTROPIC REFRACTIVE INDEX
2– REFRACTIVE INDEX WHERE FIBER IS PARALLEL TO PLANE OF POLARIZED LIGHT ($N_\parallel$)
3– REFRACTIVE INDEX WHERE FIBER IS PERPENDICULAR TO PLANE OF POLARIZED LIGHT ($N_\perp$)
4– BIREFRINGENCE ($N_\parallel - N_\perp$)
  (A) Interference colors
  (B) Quantitative birefringence
5– SIGN OF BIREFRINGENCE
6– DICHROISM
7– FLUORESCENCE
8– ABSORPTION SPECTROSCOPY

Establishing Significance

An association made by matching a single fiber or several loose fibers, all similar in their properties to the fibers in a designated object, is not a positive association. An association of this type does not associate those fibers with a particular object to the exclusion of all other similar objects. Objects containing a particular type of fiber and dyed in a certain manner may have been manufactured by the thousands either at one time or at different times. Likewise, the same type of dyed fiber could be present in several different types of objects. The "questioned fibers" (fibers of unknown origin) in a case could have originated from any of these many objects containing the same fiber type. It should be pointed out that these many objects would normally not all be located in one area.[5] If an association is to be made, it must be possible for an object that could be the source of a transferred ("questioned") fiber to be at or linked to the location where that fiber was found. If, then, a single "fiber match" cannot be deemed a positive association, as in the case of a fingerprint, what can be the significance of such a match?

Let us consider what a forensic fiber examiner is concerned with when conducting a comparison in a crime laboratory. He must determine that a "questioned fiber" is similar to or the same as fibers in the composition of a particular object. There can be no significant differences detected by the examiner when matching such fibers. In making this determination, the fiber examiner must compare various characteristics and properties which can be observed and/or determined. Visual characteristics include color, size, cross-sectional shape, and surface appearance. Other properties are dependent upon a fiber's composition, the conditions under which it was manufactured or processed, and the dye formulation used to color it. Also, environmental and consumer handling effects, such as fading and abrasion, may be the cause of changes in these characteristics.

Many techniques are available to the forensic scientist for the examination and comparison of these properties. It would be unrealistic and unnecessary for the forensic scientist to use all of them. There are several relatively simple but very discriminating microscopical procedures that should be performed first. A combination of microscopical procedures is especially discriminating in the comparison of colored manmade fibers. Equipment used in the fiber examinations in the Williams case included a comparison microscope, a polarized light microscope, a fluorescence microscope, and a microspectrophotometer. Fiber properties and characteristics can be studied and compared with the use of the microscopical equipment mentioned above. (See figs. 1 and 2.)

Whether other comparison procedures are necessary and the sequence in which they should be performed are important considerations to the fiber examiner, but they are beyond the scope of this article.

Once it has been determined that there is a fiber match, the significance of the resulting association depends considerably upon whether the fiber type involved in that fiber match is uncommon or unusual. The more uncommon the fiber type, the smaller the chance of finding that particular fiber type in a specific location (either in the composition of a particular fibrous object or in the fibrous debris removed from a particular object).

How is one to determine whether a fiber can be considered common or uncommon? An experienced forensic fiber examiner who has examined the composition of numerous materials can usually make an intuitive, yet accurate, determination as to whether a fiber type is uncommon. In some instances it is also possible for the examiner to develop information about a particular fiber type to establish that it is uncommon. In addition, forensic laboratories in England are presently accumulating data about the fiber types and fiber colors that they see in the various fibrous materials they examine. By classifying all fibers found in the composition of objects received in many of England's crime laboratories, they will eventually have sufficient data to make a statistically based determination as to whether a particular fiber type is common or uncommon. Until sufficient data is obtained from the above-mentioned project, the major criterion for determining what is uncommon is the judgment of an experienced examiner.

The significance question can be addressed by dividing fiber types into four groups, based primarily upon what the experienced examiner has determined and/or has come to recognize as being common and uncommon.

The first group consists of common types of fibers used in the construction of large numbers of objects. An example is undyed or off-white (lightly dyed) cotton. Most white cotton fibers, even though from different sources, will be very similar in appearance, as well as in other properties and characteristics. Because the sources of these fiber types are numerous and because it is usually impossible to distinguish these fibers from different sources, an association based on this type of "fiber match" has little, if any, meaning. A white cotton fiber would be expected to be found not only in the composition of many textile items, but also in the debris removed from many items. Other common fibers which are of limited value for significant comparison purposes include many of the white and off-white polyester fibers often used in sheets, pillowcases, underwear, and men's dress shirts. Still others include various colors of cotton fibers, such as blue cotton fibers, found in many types of blue jeans.

The second group consists of "uncommon fiber types" and can be further subdivided into three categories. The first category includes colored fiber types used in the construction of a relatively small number of items. Normally, it would be difficult and very time consuming to obtain the data necessary to show that a fiber type has been used in only a small number of items.[6] In the Williams' case, many victims were linked to the carpet in Williams' bedroom. These associations were very significant because it was possible to show that the bedroom carpet was manufactured in comparatively small amounts and for only a short period of time. These conclusions were arrived at from sales records and other information obtained from the carpet manufacturer.

The second category of uncommon fiber types includes those in objects manufactured many years ago. As time passes, these objects become fewer and fewer in number. The Williams bedroom carpet also falls into this category because similar carpet has not been manufactured since December 1971.

The third category of uncommon fiber types includes those which, while they may be present in a large number of different items, occur in items with which people do not normally come in contact. Accordingly, these fiber types would not usually be found in debris from someone's clothing. Only the experienced forensic fiber examiner could determine whether a fiber type would fit into this group. This is because only the forensic fiber examiner is concerned with the identification and comparison of fibrous debris removed from clothing and other objects.

Fibers from all three categories of uncommon fiber types were present in items from Williams' environment and were found to match fibers present in debris removed from the bodies or clothing of various victims.

The carpet in Williams' 1970 station wagon is uncommon because similar carpet was last installed by the vehicle's manufacturer in 1973. It is composed of rayon and nylon fibers,

a blend which has not been used in any type of carpet for a number of years. Even though this style and color of carpet was installed in many cars prior to 1974, the existing amount of this carpet gets smaller and smaller each year. Rayon fibers presently used for purposes other than for carpet are not as coarse as those used in automotive carpet and therefore could not be confused with rayon carpet fibers.

Trunk liners in two other cars that Williams had access to in 1979 and 1980 were composed of fibers that are not normally seen by crime laboratory personnel. This is true even though the manufacturers of these cars would have used trunk liners similar to those in Williams' automobiles in thousands of cars. The trunk liners in Williams' cars were composed of undyed manmade fibers that had a black adhesive material on their surfaces. Even though many similar trunk liners are in existence, the trunk liner fiber type is generally not seen in debris removed from clothing. Since these fibers are apparently not used for purposes other than trunk liners, someone would essentially have to be inside a trunk to have these fibers appear on his clothing.

The majority of other fibers fall into the third group, which includes all manmade fiber types dyed with particular dye formulations. Associations based on matching these fiber types are meaningful, even though these fiber types could not be shown to be unusual or uncommon, because considerable additional variety is present due to the fibers being colored. Dyed manmade fibers can be the basis for strong associations, since any one type of these colored fibers is an extremely small percentage of all the fiber types that exist. The chance of randomly finding any one manmade fiber type of a specific color in a particular location is extremely low; however, it would be nearly impossible to obtain actual probability estimates. There is enormous variety within the six common generic classes considering only undyed fibers. When color is added to these manmade fiber types, the variety is increased tremendously, thereby increasing the significance of a fiber match. There are about 7,000 dyes in existence, many of which are used to color either natural fibers or manmade fibers.[7] Although these dyes can be used individually, they are often mixed together in combinations of two or more individual dyes. This mixing of different dyes results in a colored fiber having a particular dye formulation (a listing of the type and amount of each individual dye). These dye formulations are usually unique to a particular manufacturing company and change often as the popularity of colors and shades changes. Even though there may be only several hundred different colors that the eye can distinguish, there are many different ways in which these colors can be obtained. Companies seldom, if ever, attempt to exactly duplicate another's dye formulation.

If there are well over a 1,000 different manmade fiber types produced and if each textile producer uses different dye formulations to color its textile materials, the result is an extremely large number of fiber types that could be distinguished from one another. Each individual colored manmade fiber type would then be a very small percentage of all the fiber types that exist.

A preliminary study conducted in England illustrates the small chance of finding a particular fiber type in a randomly selected location. It was conducted to determine the likelihood of finding fibers in debris like those in a particular garment by pure coincidence. In this study, four control sweaters were selected that had been produced in large numbers over a long period of time and had been distributed widely throughout England. These sweaters were composed of woolen fibers and/or different types of manmade fibers. The fibrous debris from 250 garments that had been submitted to the laboratory system were searched and only 6 woolen fibers were found that matched 1 of the 4 sweaters (the most common of these sweaters). A maximum of two fibers consistent with this woolen sweater was found in the fibrous debris from any one garment. No fibers consistent with the other three sweaters (composed in part of dyed manmade fibers) were located. The authors of this study concluded that although many more garments should be examined, it appears that to find more than a small number of fiber matches by pure coincidence would be extremely unlikely.[8]

Obviously, there will be an overlapping within the three groups described as "common," "uncommon," and "colored manmade." Some fiber types that fit none of these groups fall into a fourth group. This fourth group would include colored cotton fibers and colored woolen fibers. With natural fibers, color is the most important characteristic used for comparison.

GENERAL CONSIDERATIONS—FIBER EVIDENCE CRIME SCENE

1. Obtain and package as soon as possible
   a. Before it is lost
   b. Before contamination
2. Look for the obvious
   a. Clumps of fibers
   b. Pieces of fabric, tape, rope, yarns, thread, individual filaments
   c. Fabric impressions (possibility of fibers being present)
3. Locate logical sources for fibrous evidence found on a victim or at a crime scene
   a. Carpet and rugs
   b. Upholstery
   c. Bedding
   d. Suspect's clothing
   e. Wigs, hairpieces, fake fur
   f. Cordage and tape
4. Miscellaneous considerations
   a. Photograph locations of fibers, pieces of fabric, and fabric impressions
   b. Obtain entire item, if possible
   c. Obtain lifts of impressions when entire item is not obtainable

PACKAGING FIBROUS EVIDENCE

1. PROTECT EVIDENCE from:
   a. Contamination
   b. Loss of trace evidence
   c. Further damage
2. PROTECT stab holes, bullet holes and impressions (in blood, soil, etc.) DO NOT FLATTEN!
3. Remove fibers, yarns, etc. which may become dislodged (noting exactly where removed from item)
4. Cover area of an item (e.g. baseball bat) which contains fibers (etc.) with paper (seal edges)
5. Wrap *fabric impressions* so that: (1) they cannot be rubbed or scratched, (2) fibers cannot be lost, (3) no contamination can take place and (4) impression is not flattened.
6. Use *separate boxes* to package containers of evidence from *different people* and/or from *different locations.*
7. Identify (mark) and seal each container
8. Do not place fibers, yarns, etc. *directly* into plastic or glass containers

Use *paper* (folded in druggist fold) or *paper* envelopes (seal all 4 corners); these paper containers can then be placed into a plastic envelope and sealed.

CASES WHERE FIBER AND FABRIC EVIDENCE CAN BE IMPORTANT

1. Crimes of violence (murder, rape, assault)
   a. Transfer of individual fibers between suspect objects and victim objects
      1. Items of clothing
      2. Carpet (residential and automotive)
      3. Bedding
      4. Hair combings (head and pubic)
      5. Fingernail scrapings
      6. Adhesive surfaces of tape
   b. Fibrous materials left behind at crime scene by suspect or victim
      1. Clothing, wigs, masks, hats
      2. Gloves
      3. Portions of fibrous materials (cut or torn)
      4. Pieces of tape and cordage
      5. Button (with attached fibrous materials)
   c. Weapons and damage from weapons
      1. Guns, knives, clubs, ice picks
      2. Stab and bullet holes
   d. Impressions on fabric (shoe or hand print in blood)
2. Arson
   a. Portions of fuses
   b. Fabric in bottles
   c. Charred portions of garments
3. Robbery, burglary, breaking and entering
   a. Items left at crime scenes
      1. Masks, hat, wigs, clothing
      2. Pieces of fabric
   b. Items and fibrous material along getaway route
   c. Fibers and fabric found at point of entry and exit
4. Extortion
   a. Fibers under envelope flap, tape, and stamps on envelope
   b. Glove impressions
5. Hit and Run
   a. Fibers and fabric on vehicle
   b. Fabric impressions on vehicle
6. Explosive Devices
   a. Fibrous debris from tape
   b. Tape, cordage, and fabric comparisons

Associations with these fibers can be meaningful if the laboratory uses a discriminating technique such as thin-layer chromatography or microspectrophotometry to compare color.

There are other factors that must be considered when assessing the significance of a fiber match.[9] These conditions will be discussed when the results of the fiber examinations in the Williams case are discussed. Apart from the frequency of the fibers involved, various circumstances can measurably add or detract from the strength of an association.

Recovery of Fibrous Materials

Collection of fibrous materials may be from the scene of a crime, from a body, or from any setting where fibers of importance may be present. In the majority of cases, the investigator has the responsibility of obtaining fibrous evidence or at least maintaining the actual evidence in such a way that loosely adhering fibrous debris will not be lost. When a murder victim is involved, a crime scene search must be conducted at the recovery site. Also, a thorough examination must be made of the body away from the crime scene, preferably before and during the autopsy.

Human and animal hairs, as well as textile fibers, can be important. All fibrous materials should be collected at the same time. It is also important to realize that procedures used to collect fibrous evidence may interfere with or prevent the recovery of other types of evidence and vice versa. The crime scene search must be organized to prevent the loss of all types of evidence.

Figure 3

RECOVERY OF FIBER EVIDENCE FROM CRIME SCENE OF A MURDER VICTIM

1. Limit access to crime scene
2. Photograph body
3. Visual inspection (special lighting) of body and surrounding area
4. Use of transparent tape on exposed body areas
5. Place bags over victim's hands
6. Use new white sheets to transport body
7. Obtain all clothing and sheets; place each item into a separate paper bag at morgue or hospital
8. Close visual inspection of body at autopsy (best with magnification)
9. Use of white cotton packed into teeth of comb to collect fibrous debris from head hair and pubic hair areas, at autopsy
10. Consider evidence associated with transportation of body to crime scene
11. Consider use of vacuum cleaner for large amounts of fibrous debris

Figure 4

VALUE OF FIBER EXAMINATIONS

1. Establish a sequence of events
2. Link a murder weapon with a victim or suspect
3. Help to corroborate a victim's account of circumstances surrounding an assault
4. Provide leads to investigators about murder victim's surroundings at time of murder
5. Link together a number of different (sometimes apparently unrelated) victims or criminal activities
6. Establish a high probability that contact or some other association has taken place between people and/or objects

The investigator must be aware that in virtually all criminal situations, fiber evidence will be involved. This is particularly true in crimes of violence, especially in murder cases where the victim's body has been moved. All items of clothing and other items of importance should be obtained as quickly as possible and secured in paper bags. If hairs and fibers are seen by the investigator, they should be placed inside a sheet of paper which, after folding and labeling, can be placed inside another container.

The actual methods of fiber recovery used depend upon individual circumstances. Since many of these procedures are best carried out at the medical examiner's or coroner's laboratory, the investigator should coordinate his activities with one of these laboratories. It should be the responsibility of the investigator to remind those conducting the autopsy to be aware of fibrous materials and also to conduct their examinations in a manner that would prevent contamination. (See fig. 3.)

There are a number of procedures and techniques that can be used in the crime laboratory for the collection of fibrous material from items received, including removing of debris with tweezers, scraping fibrous debris from objects with a spatula, using tape to remove fibrous debris, and vacuuming. Some of these techniques have been discussed in forensic science literature and a study of the efficiency of these techniques has also been published.[10] The technique selected normally depends upon the circumstances of the case, as well as the equipment, space, and facilities of the crime laboratory. An important aspect of the fiber recovery procedure in the crime laboratory, regardless of the procedures used, is a program of contamination prevention.

When properly done, the collection process is laborious and time-consuming. However, many benefits can result in evidence obtained from a thorough search. (See fig. 4.) These benefits are nowhere more apparent than in a review of the Williams case. However, before discussing the actual trial, it is interesting to see how Williams was developed as a suspect in the Nathaniel Cater murder. Part II of this article will deal with this subject and the fiber evidence presented at his trial.

FBI

(To be continued)

Footnotes

[1] *The National Law Journal,* vol. 3, No. 43, July 8, 1981, p. 1.

[2] *Man-made Fiber Fact Book Update: Statistics* (Man-made Fiber Producers Association, Inc., 1980).

[3] Ibid.

[4] L. C. Nickolls, "The Identification of Stains of Nonbiological Origin," *Methods of Forensic Sciences,* ed. Frank Lundquist, vol. 1. (N.Y.: Interscience Publishers) 1962, p. 335.

[5] To illustrate this point, assume that 200,000 automobiles were manufactured, each containing a carpet with a particular type of carpet fiber. These automobiles were then sold and distributed evenly throughout the United States. The population of the United States in 1980 was around 220 million. It could be argued that a metropolitan area in the United States with a population of 2,200,000 would have approximately 2,000 automobiles containing the carpet of interest. These 2,000 automobiles would be a very small percentage of all of the automobiles in that particular metropolitan area.

[6] This category would include silk fibers, cashmere fibers, nytril fibers, and aramid fibers, as well as other fiber types that are very expensive, which were never fully commercialized or are not used in common textile materials. These fiber types are rarely seen by crime laboratory examiners.

[7] *Encyclopaedia Britannica,* 15th ed., vol. 5, 1974, p. 1105; see also *The Analytical Chemistry of Synthetic Dyes,* ed. K. Venkataraman (N.Y.: John Wiley and Sons), p. 2.

[8] R. Cook and C. P. Wilson, "The Significance of Finding Extraneous Fibers in Contact Cases," Metropolitan Police Forensic Science Crime Laboratory, Report, No. 5 (1981). London, England.

[9] Max Frei-Sulzer, "Coloured Fibres in Criminal Investigations," *Methods of Forensic Science,* ed. A. S Curry, vol, IV, 1965, p. 172, for a brief discussion of the evidential value of fiber evidence.

[10] C. A. Pounds, "The Recovery of Fibers from the Surface of Clothing for Forensic Examinations," *Journal of the Forensic Science Society,* vol. 15, 1975, p. 127.

Nonverbal Elements in Courtroom Demeanor

"Through careful attention to the nonverbal messages being sent, you can instill confidence in the testimony you are giving."

By
JOHN L. WALTMAN, Ph. D.
Assistant Professor
Louisiana State University
Baton Rouge, La.

Police officers experienced in courtroom testimony know the value of professional courtroom demeanor. Probably the most important aspect of that demeanor is professional, competent, nonverbal communication. A number of studies have shown that nonverbal signals are the largest source of information in interpersonal communications. In fact, the actual words spoken may account for as little as 7 percent of a message, while the other 93 percent comes from nonverbal elements.[1] The actual words used in courtroom testimony probably carry more weight than these statistics indicate, but nonverbal signals still carry the bulk of the message.

Nonverbal communication is simply that part of communication that is not verbal. Thus, tone of voice is considered a nonverbal element along with rate of speech, gestures, posture, eye contact, distance, and dress.

These nonverbal signals may be consciously or unconsciously sent and are sometimes sent even when we try to avoid doing so. The knowledgeable communicator who knows what meaning people can give to nonverbal signals controls those signals as much as possible.

Law enforcement professionals use nonverbal cues in their work everyday. Drug enforcement officials and airport security personnel use profiles of potential offenders for screening. Police officers develop a sixth sense that is actually an acute awareness of nonverbal signals sent by suspicious persons.

A jury "reads" an officer's nonverbal messages during testimony, and these signals can color their perception of him. Officers should be aware of how positive signals can be sent and how negative signals can be avoided.

Dress

The clothing you choose to wear while testifying may affect the jury's perception of your testimony. The officer who testifies in civilian clothes should dress conservatively—preferably in a suit with a shirt and tie. Sport coats with open-necked shirts and leisure suits are too informal. For women, a conservative dress is more advisable than a pants suit.

The jury may not take seriously a person who cannot dress properly. When choosing clothes, beware of big plaids. Plaids should not be mixed with stripes or checks. Beware of flashy colors or mixing clashing colors. Do not wear white socks with a suit, wrinkled clothes, clip-on ties, or ties that are too long or too short.

Proper dressing also demands close attention to details. People perceive a sloppy dresser as a person who is also careless in the details he reports during testimony.

An officer usually appears in uniform since the uniform generally makes a person seem more believable. The uniform should be neat and pressed with all brass polished. To make the best impression, an officer should not wear unnecessary equip-

END