

Letters to the Editor

Discussion of "Fiber Evidence: Laboratory Methods and Observations from Casework"

Sir:

Wilkaan Fong is correct in his paper "Fiber Evidence: Laboratory Methods and Observations from Casework," published in the Vol. 29, No. 1, Jan. 1984 issue of the *Journal*, pp. 55-63, that there has been a comparative lack of articles dealing with general techniques of fiber examinations relevant to forensic science, but the picture is not quite as bleak as he painted it. Although written nearly 20 years ago, many of Max Frei-Sulzer's observations in "Coloured Fibres in Criminal Investigation" [1] and the basic methods he describes are still very valid today. A more recent and detailed step-by-step description of procedures that have been widely accepted for fiber identification and comparison can be found in the *Biology Methods Manual* published by the Metropolitan Police Forensic Science Laboratory, London [2]. More recently books by Saferstein [3] and Maehly and Stromberg [4] both contain chapters giving a lot of useful information concerning fiber collection, identification, and comparison. The latter volume has quite an extensive bibliography incorporated in the relevant chapter.

I have some comments on Mr. Fong's paper that I hope the author will view as constructive criticism.

As pointed out, the use of adhesive tape for fiber recovery is certainly superior to vacuum sweeping, but the technique of "rollering" the whole surface of a garment onto one tape has the disadvantage that it does not allow the examiner to localize the point of origin of the found fibers, which as pointed out by both Kirk [5] and Frei-Sulzer [1] may be of considerable value and significance. This problem may be overcome by dividing garments into convenient areas and using individual lengths of tape. Secondary transfer certainly occurs to some extent, making cautious interpretation necessary [6]. For rapid and accurate scanning of tapes, may I recommend that Mr. Fong tries using a grid system as described in Ref 7.

The practice of making wet mounts and then sealing the edges around the coverslip is cumbersome. Permanent mounts can be made more quickly, are safer to transport and store, and still allow rapid identification of single fiber mounts under polarized light [2]. A very suitable mountant is XAM Improved Neutral White.¹ This meets the rigid criteria required for such forensic mounting media [8]. It has a refractive index (RI) of 1.491 which allows better visualization of the surface details, being further removed from the RI of most textile fibers.

The use of a permanent mounting medium allows rapid mounting of single found fibers under individual coverslips; Propper 12-mm diameter, thickness 1 (SGA Scientific, Bloomfield, NJ) are ideal. Segregation is automatic; since one is always looking for fibers matching those in a control taken from a known source, not for random fibers, the tapings can be systematically scanned for one type at a time. Each fiber can be given a number ensuring that any successive testing can be carried out on the same fiber. Exact fibers can be recalled later should any reexamination be necessary. The allocation of numbers greatly simplifies note taking and summing up at the end of a complex case. When further examination is carried out after microscopy, the coverslip can be broken using a diamond tip and the fiber removed from its mountant by dissolving the latter in a little xylene.

Color is of prime importance in fiber comparisons as Mr. Fong states. I believe alternate viewing of suspect and control fibers on the same microscope and comparison of the color of one fiber with the "retained mental image" of the other is a dangerous practice. Pairs of fibers of the same type can be found which have only such slight differences in color or delustrant or both that this is only apparent after a prolonged examination with a comparison microscope

¹Obtainable from Searle Diagnostic, P.O. Box 53, Lane End Rd., High Wycombe, Bucks. HP124HL, England.

using up to $\times 250$ or even $\times 400$ magnification. Should "fine differences" be discounted by "objective reasoning"? If they are fine differences in fiber color or morphology then I think not, as almost imperceptible differences in color are inevitably confirmed by microspectrophotometry or thin-layer chromatography or both. Without the aid of simultaneous viewing and, in the absence of any dye examination, I believe it would be easy to conclude erroneously that such fiber pairs could have common origin.

A study ongoing in this laboratory has shown that from 146 acrylics and 91 polyesters collected from casework controls during 1981 to 1983 and all known to be from different sources, fibers in 9 pairs of acrylic and 10 pairs of polyester samples could be matched under the comparison microscope. That is not to say the paired samples match in their entirety, but if fibers from one sample were considered as "suspects" they could be fitted into the range and matched with fibers of the same type in the opposing sample. Eight/twelve from these pairs could *immediately* be distinguished by microspectrophotometry; more work is in progress on the remaining seven samples. In addition to the matches, a further four pairs of red acrylics and eleven pairs of blue polyesters were only eliminated after considerable microscopical scrutiny. All except two pairs (on which further runs would be necessary) have different absorption spectra, confirming the reliability of visual comparison under the right circumstances.

With a good comparison microscope, for example, a Leitz based on the Ortholux model with one fiber optic light source, balancing the illumination presents little problem. If necessary a slight difference can be compensated by using a Wratten Neutral Density filter. Without a comparison microscope, control and suspect fibers can be mounted side by side under the same coverslip, but if this debatable method is used extreme care is necessary to avoid loss or confusion and repeated comparisons against different samples are only practicable if a liquid mountant is used.

The problems of microscopical comparison can be accentuated when dealing with very small found fiber fragments. This is particularly so with some polyester samples where there are changes of width and dye intensity in individual fibers as well as within the sample as a whole, and variation in dye uptake along the fiber length. These problems would be much increased without simultaneous viewing, where even so it is sometimes difficult to decide whether the characteristics of a fiber fragment can be found within the range of variation exhibited by the control sample.

Microscopy is the cornerstone on which fiber comparisons are based but current (state-of-the-art) techniques for polymer characterization (infrared and pyrolysis gas chromatography) and dye comparison (microspectrophotometry and thin-layer chromatography) go a long, long way toward limiting the probable origin of fibers. Mr. Fong is probably right when he says that not many fibers can be said to be "common," but let us not forget that this is only within the context of those examined from articles that pass through the laboratory. To substantiate this on a larger scale is a task of awesome enormity. The principle of Fong's suggested exercise of looking for fibers matching those from an item with widespread sales/use on casework articles parallels the work carried out by Cook and Wilson [9] and in my opinion projects of this nature are extremely worthwhile but all feasible steps must be utilized during comparison.

Michael C. Grieve
Forensic Chemist—Fiber Section
USACIL-EUROPE
APO New York, NY 09757

References

- [1] Frei-Sulzer, M., "Coloured Fibres in Criminal Investigations," in *Methods of Forensic Science*, Vol. 4, A. S. Curry, Ed., Interscience, New York, 1965, pp. 141-176.
- [2] *Biology Methods Manual*, Metropolitan Police Forensic Science Laboratory, London, 1978, Section 6.
- [3] Saferstein, R., *Criminalistics—An Introduction to Forensic Science*, Prentice Hall, New Jersey, 1981, pp. 166-180.

- [4] Maehly, A. and Stromberg, L., *Chemical Criminalistics*, Springer-Verlag, New York, 1981, pp. 107-129 and 259-263.
- [5] Kirk, P. L., *Crime Investigation*, 2nd ed., John Wiley, New York, 1974, p. 125.
- [6] Robertson, J. and Lloyd, A. K., "Observations on Redistribution of Textile Fibres," *Journal of the Forensic Science Society*, Vol. 24, No. 1, Jan. 1984, pp. 3-9.
- [7] Grieve, M. C. and Garger, E. F., "An Improved Method for the Rapid and Accurate Scanning of Fibers on Tape," *Journal of Forensic Sciences*, Vol. 26, No. 3, July 1981, pp. 560-564.
- [8] Cook, R. and Norton, D., "An Evaluation of Mounting Media for Use in Forensic Textile Fibre Examination," *Journal of the Forensic Science Society*, Vol. 22, No. 1, Jan. 1982, pp. 57-65.
- [9] Cook, R. and Wilson, C., "The Significance of Finding Extraneous Fibers in Contact Cases," *Metropolitan Police Forensic Science Laboratory Report No. 5*, July 1981.

Author's Response

Sir:

Mr. Grieve's letter is wide ranging and includes relatively unimportant gratuitously offered "matter of opinion" views requiring no space for comment. Other views expressed are deserving of commentary and I respond for the benefit of Mr. Grieve and those readers interested in fibers as evidence.

Localization of recoveries—Attempts at being all knowing, especially on matters which have low—if any—probative value, invites needless speculative argumentation, and, should be avoided. However, if the worker feels compelled to localize, he or she is not barred from doing so by using the simple device I have described.

Grid system for searching adhesive strips—I am sorry to say that I am not impressed by the grid system developed and advocated by Mr. Grieve for searching tapes. The method I describe of overlapping microscope fields ($\frac{5}{8}$ -in. diameter surface seen at X9M) serves the same purpose. However, if the worker is prone to disorientation the grid or similar method can offer advantages.

Permanent mounts—Permanency of a mount is desirable for reasons needless to enumerate. More desirable, however, is the rapid, reliable identification of many fiber types from several sources in a complex case. Rapidity and convenience favor the development of several fiber matches, and, thus, significant evidence. In short, "If you can't find an identify, you can't match." If the significance of the fibers as evidence is not developed it is useless, and the most permanent of "permanent" mounts of whatever refractive index or clarity will not improve the situation.

Refractive index of mounting medium—The method for identification [1] that I have described employs polarized light microscopy and dispersion staining as an adjunct. Critical to the latter is the reference orientation provided by the selection of Cargille liquid $n_D^{25} = 1.525$ as the mounting medium. For those easily disoriented this provision is especially advantageous. Those who have failed to grasp the meaning of the usage of the high dispersion refractive index liquid $n_D^{25} = 1.525$ are urged to carefully read my paper.

For those who are unwillingly to gain the experience recommended by examining fibers of known type there can be no hope. The method I describe, like virtually all methods requiring knowledge of fundamentals, experience, and deductive abilities, is not for dilettantes!

Alternate viewing under the same optical conditions—Mr. Grieve states that the practice of alternate viewing of two fibers under the same optical conditions is "a dangerous practice." Indeed it is if the retained mental image ability of the worker cannot extend over the 10 to 20 s it requires to interchange slides. If such is the case, there is no recourse except a comparison microscope.

However, for those who are members of deprived laboratories all is not lost and that which appears to be a disadvantage can be an advantage in disguise: the method of interchange hones the worker's perceptive abilities. The development of such abilities can only be an asset applicable on a continuing level to all aspects of a criminalist's work.

Microspectrophotometry, TLC, infrared spectroscopy, and pyrolysis GC—I advise circum-

spection in the use of instrumentation beyond microscopical examination. Many of the methods cited are destructive and difficult to apply to small samples. Also, there is always the risk of loss, however small, whenever manipulative transfers of fibers are performed.

I have observed that when an overabundance of sophisticated expensive instrumentation is available they are used because they are there. This tends to produce limited and dependent workers having a narrow understanding of the proof value of their results. These are relatively ineffective workers seeking to use esoteric devices to dazzle the less scientifically oriented users of their services, and to cover up their inability to cope with simpler methods requiring understanding as well as observational skill and deductive power. I hasten to say that a worker is not to be identified as an ineffective worker simply because he or she uses or advocates usage of instrumentation.

When the number of matches is low, for example, one or two, and involve relatively common fibers by color and type, for example, blue cottons and red acrylics, a common sense judgment can be made to seek confirmation through other methods. No microscopical method bars the usage of these other methods.

However, if the additional methods confirm the results of the microscopical matches the conclusion to be reached must be guarded. This is necessarily so until the frequency of occurrence of the characteristics revealed by the additional methods have been established. Also, if the fibers are shown not to match by the instrumental method chosen the threshold for discrimination in relation to the expected variations from a given source must be known. Otherwise, false eliminations can occur.

There is another path to take which can be more rewarding. I say, "Look for more matches." In the performance of my work if I have found one match, I think to myself, "Since there is one match, there ought to be more." This encouraging thought and its followup, in my experience, can be extremely rewarding.

A single additional match involving a relatively infrequent fiber by color and type, for example, a lavender Arnel fiber with characteristic delustrant particle distribution, will outweigh in evidential significance the total of the information gained from the previous match by any or all of the instrumental methods named. More can be written on this point, but, if so, the bottom line would be: Common sense judgments must attend our work.

Control and random fibers—The sentence in Mr. Grieve's letter, "Segregation is automatic; since one is always looking for fibers matching those in a control taken from a known source, not for random fibers, the tapings can be systematically scanned for one type at a time," is revealing.

I am certain that I am not in error in my interpretation of the meaning of this sentence since I have read it carefully several times. It is clear that Mr. Grieve has a serious misapprehension concerning a fundamental upon which success in developing fibers as evidence relies.

I now take pains to state as unequivocally as I possibly can: assuming all other considerations are approximately equal, a match involving random fibers has a significant value as evidence equal to, *if not greater than*, a match involving a control fiber from one source and a fiber found adherent on another source. I advance this statement as unassailable doctrine. In my support I invoke only the authority of reason.

The term "control fibers" is defined as representative fibers sampled from the fabric of the article under examination.

The term "random fibers" is defined as fibers adherent to the surface of the article under examination, and are not the fibers of which the fabric is composed.

In Case illustration 1 of my paper [2], two of the four fiber matches established involved random fiber matches. One of these random fibers was an orange wool which was investigatively determined to have been tracked into the defendant's household from a previous residence. This information was interesting and useful but not critical to the outcome.

In Case illustration 2, four of the five matches established involved random fibers.

I commend Mr. Grieve for the interest and initiative he has applied toward a variety of evidence which will surely take on greater importance in the future than it has in the past.

I thank the Editor of the *Journal of Forensic Sciences*, Dr. Abel Dominguez, for providing this opportunity to answer by offering commentary. I hope that by so doing I have not conveyed the impression of imperialistic supreme authority.

Wilkaan Fong
Criminalist
Laboratory of Criminalistics
Department of the District Attorney
Santa Clara County
1557 Berger Dr., Suite B-2
San Jose, CA 95112

References

- [1] Fong, W., "Rapid Microscopical Identification of Synthetic Fibers in a Single Liquid Mount," *Journal of Forensic Sciences*, Vol. 27, No. 2, April 1982, pp. 257-263.
[2] Fong, W., "Fiber Evidence: Laboratory Methods and Observations from Casework," *Journal of Forensic Sciences*, Vol. 29, No. 1, Jan. 1984, pp. 55-63.

Discussion of "The Role of Fibers in Forensic Science Examinations"

Sir:

Mr. Grieve's recent review of fiber evidence [1] was a welcome contribution to the forensic science literature. I am concerned, however, with the potential for misinterpretation of Mr. Grieve's summary of Pounds and Smalldon's fiber persistence studies. At p. 882 the statement is made that:

One of the most significant facts to emerge was that approximately 80% of transferred fibers are lost during the first 4 h after transfer.

This means that if a positive result is obtained from clothing taken within this time frame, the chances of identical fibers having originated from a different source other than the suspect one are very small, unless contact was also made with the alternative source during the same time period, otherwise the chances are that the transferred fibers would have already been lost. The number of fibers found is of course an important factor.

This passage implies that if one finds a number of like fibers on a garment, contact with a source of these fibers within 4 h may be reasonably inferred. Such an inference is not supported by the literature cited. Fiber persistence is addressed in two of the cited papers [2,3]. In the first paper [2] Pounds and Smalldon present fiber decay curves and summarize their findings as follows (p. 37):

The initial rate at which transferred fibres are lost during wear is rapid for all the recipient garments studied and the highest proportion of the original fibres remaining after 4 hours and 34 hours of wear was 18% and 3% respectively. This means that for many garments examined in casework only a few fibres at most can be expected to remain from many initial contacts. This emphasizes the importance of efficient searching techniques for the removal of the foreign fibres from the surface of garments. The shape of the decay curves suggest that *as the time of wear increases the remaining fibres may become progressively more difficult to remove* and therefore the efficiency of the available searching techniques for fibres which have persisted during various periods of wear is currently being investigated. (emphasis added)

In the second paper [3] Pounds and Smalldon offer a model that explains their data. Three categories of transferred fibers are proposed: loosely bound, bound, and strongly bound. Loosely bound fibers are lost almost immediately after transfer. Bound fibers are lost quickly,

for example, after 4 to 8 h wear. Strongly bound fibers are lost at a much slower rate, such that some fibers still remain after 34 h.

Whereas the theory of three fiber bonding states explains Pounds and Smalldon's data, we have no method to determine whether recovered fibers are in a "bound" or "tightly bound" state. Without such a method, and absent a considerable number of fibers, the inference of contact within 4 h does not appear warranted.

David A. Stoney
Criminalist/Forensic Scientist
Institute of Forensic Science
Criminalistics Laboratory
610 16th St., Suite 307
Oakland, CA 94612

References

- [1] Grieve, M. C., "The Role of Fibers in Forensic Science Examinations," *Journal of Forensic Sciences*, Vol. 28, No. 4, Oct. 1983, pp. 877-887.
- [2] Pounds, C. A. and Smalldon, K. W., "The Transfer of Fibres Between Clothing Materials During Simulated Contacts and Their Persistence During Wear. Part 2. Fibre Persistence," *Journal of the Forensic Science Society*, Vol. 15, No. 1, Jan. 1975, pp. 29-39.
- [3] Pounds, C. A. and Smalldon, K. W., "The Transfer of Fibres Between Clothing Materials During Simulated Contacts and Their Persistence During Wear. Part 3. A Preliminary Investigation of the Mechanisms Involved," *Journal of the Forensic Science Society*, Vol. 15, No. 3, July 1975, pp. 197-209.

Author's Reply

Sir:

The offending paragraph is qualified by the sentence "the number of fibers found is of course an important factor." I refer to instances where the number of matching fibers is such that they are immediately and prolifically apparent on searching "suspect" tapings—a detailed, lengthy search is not required. This situation is not uncommon. If the transfer of a variety of fiber types or colors is involved and all of these are successfully recovered without difficulty, this also lends weight to my opinion that transfer has very probably occurred recently before seizure of the items. The figures of 4 h and 18% are often cited examples concerning the rate of fiber loss but I believe some latitude of interpretation is necessary in the absence of other published data.

If only a few isolated matching fibers are found it can be more easily argued that they may have been present for a longer time period, though this depends on the type of fiber and the nature of the donor and recipient surfaces. Robertson and Kidd [1] found that polyester and viscose transfer less readily than the acrylic and wool fibers used by Pounds and Smalldon in their study [2]. They state "if polyester and viscose fibers are lost over a short period of time, as reported by Pounds and Smalldon for other fiber types, any time lag in obtaining clothing from a suspect may result in very few fibers remaining." This reinforces the statement by Pounds and Smalldon that "in casework, only a few fibers at most can be expected to remain after initial contacts." The value of 18% remaining after 4 h is a *maximum* value and if, as is likely, many of these are "strongly bound" fibers even efficient searching techniques may fail to recover them at all.

Of course there is always the theoretical possibility of matching fibers originating from an alternative source, generalizations are particularly difficult in dealing with fibers and each case must be considered according to its own circumstances. I believe it is very important in forming an opinion to establish from the case agent the time interval between the offense and seizure of the exhibits as accurately as possible; and then to weigh this up against the num-

ber, length, and type of found fibers; nature of the surfaces involved; and so forth. Further discussion of the complex factors affecting fiber loss can be found in the paper by Robertson et al [3].

The question of transfer of matching fibers from a nonrelated random source has been dealt with by Cook and Wilson [4]. Two-hundred-and-fifty items of clothing were searched for fibers indistinguishable from those of four popular garments. Matching fibers were found on only five garments searched, with a maximum of two fibers on any one item. I believe this study has since been extended. It appears to me that more studies of this nature are urgently needed to see whether this low indication of chance encounter can be further substantiated.

I feel that the above points support my theory but perhaps Mr. Stoney would be more appeased by substitution of "the chances being small" instead of "very small"!

Michael C. Grieve
Forensic Chemist—Fiber Section
USACIL-Europe
APO New York, NY 90757

References

- [1] Kidd, C. B. M. and Robertson, J., "The Transfer of Textile Fibers During Simulated Contacts," *Journal of the Forensic Science Society*, Vol. 22, No. 3, July 1982, pp. 301-309.
- [2] Pounds, C. A. and Smalldon, K. W., "The Transfer of Fibres between Clothing Materials During Simulated Contacts and Their Persistence During Wear, Part 2, Fibre Persistence," *Journal of the Forensic Science Society*, Vol. 15, No. 1, Jan. 1975, pp. 29-39.
- [3] Robertson, J., Kidd, C. B. M., and Parkinson, H. M. P., "The Persistence of Textile Fibres Transferred During Simulated Contacts," *Journal of the Forensic Science Society*, Vol. 22, No. 4, Oct. 1982, pp. 353-361.
- [4] Cook, R. and Wilson, C., "The Significance of Finding Extraneous Fibers in Contact Cases," *Metropolitan Police Forensic Science Laboratory Report No. 5*, July 1981.

Discussion of "*Datura stramonium*: A Fatal Poisoning"

Sir:

Relevant to the article written by R. W. Urich, D. L. Bowerman, J. A. Levisky, and J. L. Pflug, "*Datura stramonium*: A Fatal Poisoning" (*Journal of Forensic Sciences*, Vol. 27, No. 4, Oct. 1982, pp. 948-954), we report a case that we have recently investigated. This case involved a 23-year-old man who died and his 22-year-old companion who survived after ingesting *Datura stramonium* seeds.

The two men involved were students of a paramedical school, who smoked marijuana frequently. According to the survivor, they ran out of marijuana and tried to use *Datura stramonium* seeds to get high. Apparently, they knew from their studies the hallucinatory properties of the herb. After boiling some seeds with tea, they drank a few cups and started having symptoms of intoxication.

The symptoms included double vision, hyperthermia, flushing red skin, extreme dryness of the throat, and hallucinations. The 23-year-old man walked out to the seashore, where he was found dead the next morning.

The autopsy revealed no evidence of trauma. Multiple petechiae in the endocardium of the ventricles were found and the lungs showed severe hyperemia and edema. The appearance of the remaining organs were not remarkable except for the blood which had a bright red color. The toxicological analysis was negative for alcohol and narcotics. Unfortunately, the analysis for tropane alkaloids was not available at the time.

The 22-year-old man suffered the same kind of symptoms but recovered without medical assistance by next morning. Under investigation, he explained the events leading up to his

companion's death and showed the seeds that were ingested and which were further identified as *Datura stramonium*. According to this information, the cause of death for the other young man was quite clear.

This unusual case of intoxication by *Datura stramonium* apparently does not suggest routine toxicological analysis for alkaloids of tropane. It rather indicates that some ancient poisons may still be in use today and can cause medicolegal problems.

M. Michalodimitrakis, M.D., J.D.

Prof. A. Koutselinis, M.D.

University of Athens

Department of Forensic Medicine and Toxicology

M. Asias St., Goudi 609

Athens, Greece

Authors' Response

Sir:

Certainly the case described by Prof. A. Koutselinis, M.D. and M. Michalodimitrakis, M.D., J.D. appears to be a fatal poisoning involving the alkaloids of *Datura stramonium*. However, the scene investigation and comments by the survivor suggest the need to document the presence of the tropane alkaloids to establish definitely the etiologic agent. The autopsy findings only suggest an anoxic death of nonspecific type.

This case describes the importance of the "team concept" in establishing the cause, manner, and circumstances of death. The team leader, be it forensic pathologist, medical examiner, or coroner, must direct and coordinate an in-depth scene investigation, autopsy, and subsequent toxicological examination, when indicated, and correlate all data to reach a reliable conclusion. Unfortunately, in this case the authors state that the toxicologic examination for tropane alkaloids was not available.

The question of doing routine toxicological analysis for tropane alkaloids in postmortem specimens was raised. In our opinion, a comprehensive toxicology program supporting the investigation of an unknown cause of death should use analytical techniques to (1) detect, (2) identify, (3) confirm, and (4) quantitate drugs, poisons, and toxic substances in postmortem specimens. The detection techniques must be sufficiently sensitive and extensive to detect a wide range of compounds, including the tropane alkaloids. In addition to *Datura stramonium*, tropane alkaloids including atropine, hyoscyamine, and scopolamine are found in *Atropa belladonna* [1] (belladonna and deadly nightshade), *Hyoscyamus niger* [2] (henbane) and numerous pharmaceutical preparations. Even though *Datura stramonium* may be considered a rare and ancient poison, routine toxicological procedures should include detection of the poisonous alkaloids, for these alkaloids are not rare, and are commonly encountered.

David L. Bowerman, M.D., F.A.S.C.P., F.C.A.P., F.A.A.F.S.

Laboratory Director, St. Francis Hospital

El Paso County Coroner

Joe Levisky, Toxicologist

Saint Francis Hospital

Sisters of St. Francis

East Pikes Peak and Prospect

Colorado Springs, CO 80903

References

- [1] Claus, E. P., Tyler, V. E., and Brady, L. R., *Pharmacognosy*, 6th ed., Lea & Febiger, Philadelphia, 1980, p. 230.
- [2] Kingsbury, J. M., *Poison Plants of the United States and Canada*, Prentice Hall, Inc., Englewood Cliffs, NJ, 1964, p. 282.

Level of Alcoholic Intoxication

Sir:

In response to Dr. Green's request (*Journal of Forensic Sciences*, Vol. 29, No. 1, Jan. 1984, p. 16) for information on the level of alcoholic intoxication of the drivers in single vehicle, fatal accidents, the following is submitted for Utah:

Number of single vehicle auto accidents in the State of Utah in which the driver died within 1 h, 41.

Number of above in which blood ethanol levels were determined, 36.

Number of 36 in which there was:

No ethanol detected in blood:	21
Less than 0.10 gm/dL in blood:	1
0.10 gm/dL or more ethanol in blood:	14

From this data, Utah had 38.9% of all drivers involved in single-vehicle fatal accidents (within 1 h) with blood ethanol levels of 0.10 gm/dL or greater in 1982. These results may be related to laws in the State of Utah which restrict availability of alcoholic beverages.

My thanks to Arlene Cox of the Department of Highway Safety, State of Utah, for this data. In the State of Utah, highway deaths *do not* come under the jurisdiction of the Office of the Medical Examiner.

Richard Sander, M.D.
Assistant Medical Examiner
Office of the Medical Examiner
State of Utah
44 Medical Dr.
Salt Lake City, UT 84113

More Discussion of "Minimal Velocities Necessary for Perforation of Skin by Air Gun Pellets and Bullets"

Dear Sir:

The purpose of my previous letter [1] was to correct a numerical and dimensional problem I encountered in the literature [2,3]. I did not attempt to correct the equation of DiMaio (which was editorially introduced in my letter) as it appeared to be an obvious typographical error in the original article. I mistakenly assumed that the error in the equation would be obvious to others and that my correction of the numerical and dimensional problem would be equally obvious.

Vitale and Bergh [4], however, have made precisely the error my letter was meant to prevent. E/a ratios do not reduce to $\text{m} \cdot \text{kg}/\text{cm}^2$. The kilogram is a unit of mass *by definition* in the metric system, not a unit of force or "weight" (one must learn to use the equation $w = mg$ by itself before substituting it into other equations). The joule (also known as $\text{kg} \cdot \text{m}^2/\text{s}^2$ or $\text{nt} \cdot \text{m}$) is a unit of energy in the metric system, while the $\text{m} \cdot \text{kg}$ is a unit of nothing. As a result, energy per area ratios can not be dimensionally correct if given in terms of $\text{m} \cdot \text{kg}/\text{cm}^2$. Correct is joules/ cm^2 or $\text{kg} \cdot \text{m}^2/\text{s}^2 \cdot \text{cm}^2$ as I noted before.

If doubt concerning dimensions still exists, I can only refer the doubter to *any* elementary physics text for sufficient proof and justification.

David C. Warniment, M.S. (Physics)
Firearms Examiner
Jacksonville Regional Crime Laboratory
P.O. Box 4999
Jacksonville, FL 32201

References

- [1] Warniment, D. C., "Discussion of 'Minimal Velocities Necessary for Perforation of Skin by Air Gun Pellets and Bullets,'" *Journal of Forensic Sciences*, Vol. 28, No. 3, July 1983, p. 551.
- [2] DiMaio, V. J. M., Copeland, A. R., Besant-Matthews, P. E., Fletcher, L. A., and Jones, A., "Minimal Velocities Necessary for Perforation of Skin by Air Gun Pellets and Bullets," *Journal of Forensic Sciences*, Vol. 27, No. 4, Oct. 1982, pp. 894-898.
- [3] Mattoo, B. N., Wani, A. K., and Asgekar, M. D., "Casualty Criteria for Wounds for Firearms with Special Reference to Shot Penetration—Part II," *Journal of Forensic Sciences*, Vol. 19, No. 3, July 1974, pp. 585-589.
- [4] Vitale, V. and Bergh, A. K., "Further Discussion of 'Minimal Velocities Necessary for Perforation of Skin by Air Gun Pellets and Bullets,'" *Journal of Forensic Sciences*, Vol. 29, No. 2, April 1984, p. 378.

Discussion of "Stud Guns Revisited: Report of a Suicide and Literature Review"

Dear Sir:

In the recent article entitled "Stud Guns Revisited: Report of a Suicide and Literature Review" (*Journal of Forensic Sciences*, Vol. 29, No. 2, April 1984, pp. 670-678), we reported what we believed to be the second intentional fatality by a stud gun. It has been called to our attention that we overlooked two previously reported cases of suicide by stud gun [1,2]. These reports do not change the tenor of our article, but we apologize to authors DiMaio and Spitz and Fekete for our omission.

Victor Walter Weedn, M.D., J.D.
Dept. of Anatomic Pathology
M. D. Anderson Hospital and Tumor Institute
Texas Medical Center
Houston, TX 77030

Roger E. Mittleman, M.D.
Dade County Medical Examiner's Office
1050 N.W. 19th St.
Miami, FL 33136

References

- [1] DiMaio, V. J. M. and Spitz, W. U., "Variations in Wounding Due to Unusual Firearms and Recently Available Ammunition," *Journal of Forensic Sciences*, Vol. 17, No. 3, July 1972, pp. 377-386.
- [2] Fekete, J. S., "Suicide by Self-Inflicted Head Injury with Nail (Stud) Gun," *Canadian Society of Forensic Sciences Journal*, Vol. 14, No. 4, 1981, p. 188.

Suicide and the Computer Age

Sir:

A 16-year-old black male received a home computer as a Christmas present. One week later the boy was found hanging from a closet door by a nylon rope.

Scene investigation disclosed a television attached to a computer keyboard. On the television screen was the following suicide note:

Happy Holiday to all a good night
Hate to run but I've got a date to leave this world
The walls come tumbling down
Good bye world it's been fun
Life is funny it comes and goes
And is soon forgotten in the mist of a fog

Hell, it's been so empty for me
What I did doesn't bother me at all
Life ends for me now

The growing number of home computers may result in occasional replacement of the classical handwritten suicide note by such computer based notes. Since handwriting is not involved, the authenticity of such notes may be difficult to prove. Crime scene investigators should be alert to the possibility of computers being used to document not only suicide, but other crimes as well.

Randy L. Hanzlick, M.D.
Deputy Medical Examiner, Fulton County
50 Coca Cola Pl., S.E.
Atlanta, GA 30303

Annual Meeting Sites

Dear Friends:

Real men don't eat quiche.

Real women don't pump gas.

Real Academy members hold meetings in Chicago.

The AAFS was conceived in the winter cool of St. Louis and nurtured by the icy fingers of Lake Michigan. Before sunbelt circulatory degeneration becomes irreversible let us consider meeting sites in Toronto, Montreal, Detroit, and Chicago.

Ralph F. Turner
Prof. Emeritus
Secy.-Treas. 1948-1954
4331 Hulett Rd.
Okemos, MI 48864