The CACNews

News of the California Association of Criminalists • 4th Quarter 2003

The President's Desk

Experience

Life gives you the test first and the lesson later. —Anon.

Have you ever found that to be true in your personal and professional life?

Have you ever found yourself learning something unexpectedly as a result of your decisions? And then, only later, to learn that it was not your intention in the first place?

Most people don't deliberately go out of their way to ask life to punish them with painful lessons so that they may benefit from them later in life.

When thinking back on the decision you've made in your life that resulted in great lessons haven't you marveled at the outcome? This is especially true when that was never your intention at the time. In fact, the lessons you were experiencing seemed more of an inconvenience than a benefit. Didn't you find yourself saying, "I won't ever do that again?" On the other side of the lesson are words I have heard from many cancer survivors. "Cancer was the best thing that ever happened to me." How does one explain that in light of avoiding the unpleasant even painful learning experiences in life?

I can easily point to several events in my life that have provided invaluable lessons that came as a result of the 'wise' decisions I made. Two that come quickly to mind are, my brief military career and my private forensic science career.

When I got drafted at the height of the Viet Nam war I had a choice of going into the service or heading for Canada. I believed there would have been serious consequences had I chosen to go north and avoided my duty. I wasn't happy about being drafted right out of college and flown in the middle of the night to Fort Jackson, South Carolina. While there, I had the opportunity to extend my two-year commitment to three years and become an officer. I wasn't happy at the thought of staying an extra year either. Without asking for help I made the choice to become an officer. I had no idea what I was getting myself into or where that decision would lead me. And as things turned out, that choice made over 36 years ago continues to pay huge dividends in my life. Little did I realize at the time that my year of training and two years as an officer would have has such far-reaching consequences. Upon completing active duty in early 1970, I was still at risk because the Army might require my services again. Peace in Viet Nam was still 5 years down the road. I had a decision to make whether to join the California Army National Guard for three years to avoid going back on active duty. So, the decision I made to go into the reserves was made easier with the help, experience and advice from my friends. I've never looked back.

The second of those decisions was to leave the Department of Justice and start my own consulting business. It seemed like a wise move at the time. I believed that things would continue, as they had been the previous seven years of my career with some slight differences

I never asked anyone for their advice about starting one's own business. I just jumped right in figuring that I could handle whatever came my way. What I learned after many, many painful lessons is that going into business for myself was not the liberating experience I believed it would be. Everyday was a struggle and it took all my resources of courage, imagination, and determination to survive 13 years in business. I believe every business owner has two memorable dates on their calendar: The day they started their business and the day they sold their business. I remember both of my dates with clarity: September 5, 1979 and August 14, 1992.

I paid a dear price for my naiveté by not relying upon the experience and wisdom of others. Particularly, those who had already learned those lesson the hard way. I was sorely tested yet the experience provided me with some everlasting lessons. One of which was not to let my ego get in the way of learning from others. Asking someone for help or advice put me in the position of not knowing and beholding to another. So I held back. I felt it was better to learn on my own rather than to risk looking foolish to others.

What I learned about myself during those 13 years has paid incredible dividends. I am a better criminalist for the experience and much more appreciative of those who do go into business for themselves. Regardless of the type of business. I go out of my way to thank business owners and tell them I appreciate the service they provide.

I believe there are two types of people in the world. Those who are content to experiment, fail, experiment, succeed and find their own way. Or, the ones who are willing to rely upon the experience of others to find their own way. There is no need to pay the high price of learning life's invaluable secrets. One of which is to be happy in your work. Others are to gain the respect and admiration of your peers, knowing that at the end of your career you could look back with the knowledge that you had an impact on your profession.

If there is one lesson to be gained from living life it is to have the courage and willingness to ask for advice. It doesn't matter if that advice is for buying a home, having your mother-in-law move in with you or taking a position as a laboratory director. Someone has gone before you in every human endeavor since the wheel.

I bring this up because our profession will soon see the loss of about 40 in-

Please turn to page 16

Raymond J. Davis
CAC President

The CACNews
www.cacnews.org

Fourth Quarter 2003

On the cover...
Corrie Maggay strikes while the iron is hot. More on this experiment to capture flying glass fragments on high speed video inside this issue.

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CACBits • Section News

New ASTM Standards Announced

ASTM Committee E30 on Forensic Sciences is pleased to announce the publication of seven new standards for the forensic examination of questioned documents.

Seven new ASTM standards listed below were developed by the Scientific Working Group for Forensic Document Examination (SWGDOC), working as a task group of E30. The SWGDOC draft standards were then ballotted through the ASTM International standards development process, first through Subcommittee E 30.02, chaired by Carl McClary of the Bureau of ATF, and then through the Main Committee. This allowed the widest possible participation of the forensic science community in the development of these standards. ASTM's Committee on Standards gave final approval to the standards in April, and they are now available from ASTM.

E 2285-03 Guide for the Examination of Mechanical Checkwriter Impressions

E 2286-03 Guide for the Examination of Dry Seal Impressions

E 2287-03 Guide for the Examination of Fracture Patterns and Paper Fiber Impressions on Single-Strike Film Ribbons and Typed Text

E 2288-03 Guide for the Physical Match of Paper Cuts, Tears, and Perforations in Forensic Document Examinations

E 2289-03 Guide for the Examination of Indented Rubberstamps and Their Impressions

E 2290-03 Guide for the Examination of Handwritten Items

E 2291-03 Guide for Examination of Indentations

Carl McClary, Subcommittee E30.02, the participants in SWGDOC, and SWGDOC's sponsors at the FBI Lab should be congratulated for this significant contribution to forensic science.

ASTM Committee E30 on Forensic Sciences was formed in 1970. E30 meets once a year, in conjunction with AAFS, with approximately 100 members attending two days of meetings. The committee, with current membership of approximately 500, currently has jurisdiction of 48 standards, published in the Annual Book of ASTM Standards, Volume 14.02. These standards have and continue to play a preeminent role in all aspects to forensic sciences, including criminalistics, questioned documents, forensic engineering, fire debris analysis, drug testing analysis, and collection and preservation of physical evidence. For more information, go to http://www.astm.org.

John J.Lentini, F-ABC

Caveat Examiner

Fired Cartridge Case Comparisons: 9mm and 40 Caliber Glock vs. Smith and Wesson Sigma Series Pistols.

With the introduction of Smith and Wesson's Sigma Series pistols, Model SW40F in 1994 and the Model SW9F pistol in 1995, the firearm examiner can no longer list the Glock pistol as the sole suspect firearm when considering the class characteristics of fired cartridge cases.

Due to the infrequent number of Sigma Series pistols in circulation, earlier comparisons of fired cartridge cases from the two types of pistols were limited. In this study, similarities and differences in class characteristics were compared between cartridge cases fired from a considerable number of 9mm and 40 caliber Glock and Smith and Wesson Sigma Series pistols.

Nancy D. McCombs

Yuma Proving Ground Session Set for Dec.

The 12th Annual Yuma Proving Ground Forensic Firearms Test Session will occur Dec. 5th and 6th, 2003. Each fall since 1992 the U.S. Army Yuma Proving Ground along with the Arizona Department of Public Safety and the Southern California Firearms Study Group has hosted a test session to study exterior ballistics and other firearms and forensic related issues. YPG offers us the use of Doppler Radar and High Speed Video equipment to do what ever experiments we wish, as long as they are safe to conduct.

Anyone who wishes to attend should contact Bill Morris (AZMorris@AOL.com) or myself: James.Roberts@mail.co.ventura.ca.us (805) 477-1947. Anyone who has not attended one of the sessions in the past must provide Bill Morris, at the above e-mail address, with the necessary security information by early November. Anyone with an experiment to propose should contact me, Jim Roberts, at the above e-mail address or phone number.

This year we also need a list of all firearms and ammunition that will be brought onto the base. This must be supplied in advance and can best be supplied when your experiment is submitted. Do not expect to be able to bring firearms or ammunition onto YPG that you have not documented in advance. This does not need to include serial number but should include an adequate description such as caliber and make and model as well as amount of ammunition.

Anyone wishing to use special equipment or the photographic unit equipment should contact us as soon as possible with these requests. Any use of special fixture, stands or the like need to be coordinated in advance.

This is an informal experimental session, no registration fee is involved. All participants will be responsible for their own lodging and food. Most people stay at the La Fuente Inn & Suites, 1513 E. 16th St Yuma, 877-202-3353. They offer a government rate to us. This is our meeting point at 7:00 A.M. Friday morning to caravan to the Proving Ground. Some of us meet on Thursday evening at the La Fuente Inn to finalize the next days planned schedule. We generally pool our money and send out for pizza for Friday lunch. Most of us gather at a local Restaurant for Friday Dinner. We again meet at La Fuente at 7:00 Saturday morning to caravan out. The session breaks up Mid-afternoon on Saturday, depending upon scheduled experiments.

NCIS Featured in TV Series

In the coming season there will be a new TV show that features the Naval Criminal Investigative Service (NCIS) and also features an NCIS Crime Laboratory. Bob Blackledge hastens to add that any similarities to any "real" NCIS labs are purely coincidental! This show is a spin-off of the established TV series "*JAG*." The last two shows of *JAG* last season served as an introduction, and rated very highly with a test market. The star of this new show will be Mark Harmon, who will play an NCIS Special Agent [many law enforcement agencies have agents, but as with the FBI, in NCIS our agents are "Special"]. Featured as the Crime Lab Criminalist on the show will be actress Paulie Perrette. Writers and producers for *JAG* and this new show have visited the San Diego NCIS lab on two occasions. They interviewed the staff individually and took lots of photos. Paulie spent an afternoon with the lab and reports from the field indicate she is very nice and is genuinely interested in forensic science. Later in this issue you will find some of the photos that were taken during Paulie's visit.

Show Your True Colors!

Decorate your lab with official CAC merchandise

T-shirts, coffee mugs, retractable badge holders! Available at any semiannual seminar and direct from the CAC. Contact Curtis Smith
curtis.smith@doj.ca.gov

Just in: CAC 14 oz. stainless steel mugs ($10), CAC Acrylsteel Mugs in Candied Apple Red and Sapphire Blue. ($12), CAC 8 oz. wine glasses ($5). Please note: Polo shirts and denim shirts will be available if ordered PRIOR to the seminar. We also have a new shipment of navy blue T-shirts "When your day ends. . . Ours begins" with chalk outline.

UPCOMING MEETINGS

2003
Fall: **San Diego Sheriff**

2004
Spring: **San Mateo Sheriff**
Fall: **Ventura Co Sheriff**

2005
Spring: **Oakland PD**
Fall: **Los Angeles PD**

2006
Spring: **Contra Costa Sheriff**
Fall: **DOJ Riverside**

2007
Spring: **DOJ Richmond DNA**
Fall: **Orange Co. Sheriff**

2008
Spring: **Sacramento DA**
Fall: **TBA**

2009
Spring: **Santa Clara Co.**

Can't Find It?

To reduce the costs of publication, the *CACNews* may place calls for nominations and other items that were previously found in the newsletter mailing as inserts ON THE WEB. Visit www.cacnews.org to see what is offered. Content changes periodically, so visit often!

CAC Committees

ABC - Jennifer Mihalovich
Awards - Julie Leon and Kevin Andera
Bylaws - Hiram Evans
CCI Advisory - Michael Parigian
DoHS - Kenton Wong
Endowment - Jim Stam
Ethics - Mike Grubb
Financial Review - John Houde
Founders' Lecture - John DeHaan
Historical - Jon Babicka
Merchandising - Curtis Smith
New Member - Michael Parigian
Nominating - Sue Brockbank
Publications - Ron Nichols
Public Information - Bonnie Cheng
Seminar Planning - Joe Hourigan
Training and Resources - Pennie Laferty & Jeanne Parsons

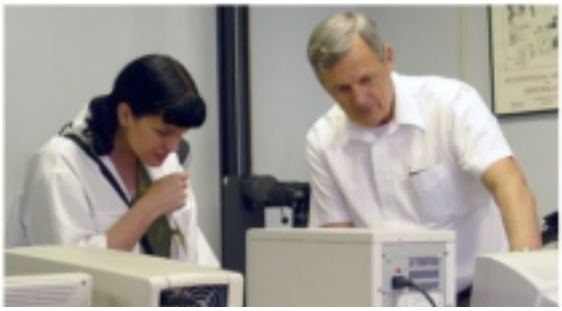
If you are no longer a committee chair, please e-mail me to tell me who the new person is.

Brooke Barloewen
Recording Secretary

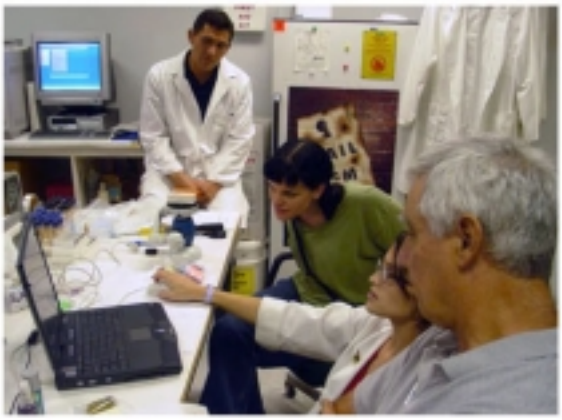
CBS 2003-2004 FALL PREVIEW

NAVY NCIS

Tuesdays 8PM ET/PT



(Below right) Members of the San Diego Regional Forensic Laboratory pose with actress Paulie Perrette during her visit to the lab on July 17. (bottom left) SA Rob Bratz gives Paulie a tour of the MCRT van at Field Office. (top left) Paulie carries out a trial of adhesive removal used in the processing in many types of evidence. (bottom right) Paulie after she successfully lifts latent finger prints. (top right) NCIS Fingerprint Specialist James Lawson explains fingerprint analysis to Paulie. (second from top left) NCIS Forensic Chemist Nathan Salazar demonstrates the FTIR with microscope to Paulie. (third from top left) NCIS Intern Corrie Maggay and NCIS Senior Forensic Chemist Bob Blackledge explain an experiment in collecting glass fragment evidence to Paulie as NCIS Forensic Chemist Nathan Salazar looks on.



Notes on a Scorecard

Time to ponder the great scientific questions of the modern era…

Is the Missing Link missing because it has yet to be discovered or simply because it does not exist? If the former is true, are evolutionists Bayesians? If the latter is true, is it truly missing? Hmmm, if a tree…

On a side note…

If the Missing Link does exist, is found in time, and is determined to be a resident of California would it throw its hat into the Gubernatorial circus along with such political notables as Gallagher, Larry Flynt and Ahhhhhhh-knolled? My response to the chuckles and jokes from across the country? "I am not a native!" (I know, I know…who is?!)

Thinking to a logical conclusion…

In *Monty Python and the Holy Grail*, the villagers brought a woman to the magistrate claiming she was a witch. When asked why they thought she was a witch the claim was that she "looked" like one. Well, before long it was determined that it was the villagers who dressed her that way. In an attempt to get the villagers to think logically, the magistrate asked what they do with witches. When they answered, "burn them," he asked what else burns? Before long they came up with the proper answer – wood! "So why do witches burn?" the magistrate continued. "Because they're made of wood," came the reply. Pleased with the response but not yet done, the magistrate asked how one determines if something is made of wood. Once again a debate ensued, but the conclusion was clear – you determine if something is made of wood by seeing if it floats. However, the magistrate did pose the question as to what else floats and before long he got the answer he sought – a duck. So, following this entire flow of logic the magistrate prompts the villagers, "Exactly, so logically…" The reply, "If she weighs the same as a duck, she's made of wood." Pleased, the magistrate further prompts them to reach their own conclusion when he says, "And therefore?" The villagers proudly responded, "A witch!"

Out of nowhere…

Seabiscuit – was this a movie about a horse that was too small, a jockey who was blind and too large, a trainer who was too old, or an owner who was "too stupid to know any better?" It was a movie about heart and an important management lesson – often times an individual's credentials or seeming lack of them does not tell the whole story. It is vital to think outside the box, especially when dealing with people.

The first thing that needs to be established is an agreement. An agreement to leave pre-existing biases at the door, to promote the field and the science over personal agendas...

Arrogance need not apply.

The ever so necessary Giants update…

As of this writing, the Giants are 69 and 42, 12 games ahead of their closest rival in the Western Division. I will admit that there was some worry since the last issue because the Dodgers pulled real close. But considering they are now in third place and a distant third at that, I think it is most appropriate to no longer refer to them as Dodger Blue, but Dodger Who? Or, as a friend Scott Hester has said, maybe Dodger Blue-it?!

Advancement throughout the years…

"DNA has come a long way," James Watson, Nobel Laureate. DNA is the single biggest advancement in forensic science and criminal justice in the last 20 years. It has resulted in a more critical look at our profession, which in turn has resulted in accreditation and certification efforts, which, while not completely without flaw, bring far more positives to the table than negatives. It has also resulted in the judicial system wanting better answers than they have been accorded in the past, especially from the identification disciplines within forensic science. This in turn has resulted in the various disciplines taking an introspective look in an effort to provide the best possible explanation for what they do and claim. All these are positive ramifications of the arrival of DNA into the forensic realm. Do negatives exist?

On a more serious, but related note…

"I know it when I see it." That was the answer of the villagers in *Monty* Python and it was far too often the answer when a practitioner within one of the identification disciplines was asked how he or she knew they had an identification. Recently, the identification disciplines have come under increased fire as the courts demand better answers to questions they have every right to ask. As a result, practitioners within some of the disciplines have attempted to get together and attempt to better define what they do and how they do it.

Ron Nichols
CAC Editorial Secretary

If one examines the various disciplines, one will see the emerging of camps within some, each declaring that they have the best answer to the question. Often times, this comes at the expense of launching attacks on the other camp and at times the debates have become quite heated. Personally, especially for firearms, I think the best way to solve these disagreements is with a paint gun war instead of the golf tournament preceding the annual AFTE conference.

The first thing that needs to be established is an agreement. An agreement to leave pre-existing biases at the door, to promote the field and the science over personal agendas, to be receptive to change, and finally, to openly exchange information to further the science and provide the best product possible. Arrogance need not apply.

Secondly, respect is paramount. Nothing will cause a discussion to degenerate into a pile of dissension and discontent faster than a lack of respect for one another. We do not have to agree with each other. There is nothing that compels us to do so. However, human decency does compel us to be respectful towards one another and treat one another accordingly. There is no excuse for anything but such consideration and it matters little the forum in which the discussion is occurring. What does this mean? No disparaging comments, no stereotyping of an individual, and no cynicism. More often than not, these are the results of built-up anger and inappropriate for a constructive discussion on an issue.

Before moving into the third issue, I would like to tell a story in which a daughter was asking her mom why she cut off the ends of the ham before she placed it into the pan to bake it. Her mom responded that she did not know but did it because that's what her mom did. So the inquisitive daughter went to her grandmother who was in the other room and asked her why the ends of the ham were cut off. The grandmother also did not know, saying she had done so because she had seen her mom do it. The daughter became even more curious and would not be satisfied until the answer was reached. So, she called her great-grandmother and asked why she cut off the ends of the ham. The great-grandmother had to chuckle when she answered, "So I could fit it into the pan."

Long after the reasons have been forgotten, tradition continues. The third issue has to do with introspection. Prior to defending to the death what we do and how we do it, we need to look at what we do and how we do it and determine why. Before wondering whether this is necessary, we need to keep in mind that if we do not ask the questions of ourselves then we will likely be asked the question by others and those others may be representatives of the court as we are sitting on the stand. If we think the answer "I know it when I see it," sounds arrogant to our clients, how about, "I do it that way because it's the way it always has been done." Our clients deserve better answers and so do our colleagues. Along with arrogance and guns, we need to check the anecdotal evidence at the door. We need to come armed with science folks and if it becomes necessary, be prepared to break with sacred tradition.

Finally, it requires involvement. I have become increasingly disturbed about the apathy that exists within this profession. We all seem to have our complaints and we all seem to have our issues but what we do not offer is our time. We even have excuses for that as well. But we need to consider something. If one of our colleagues goes to the stand ill-equipped to answer the tough questions, it can have ramifications for the discipline as a whole if the courts decide that it is a discipline-wide issue and not restricted to a single examiner. Whether we like it or not, the reputation of what we do is placed on the stand anytime one of our colleagues takes the oath. So, it is important that we all get involved, leaving excuses behind. It is not necessary to become heavily involved as it is recognized that some simply do not have the time others may have. However, even a little involvement is useful. Each of us has a right to be heard and forensic science needs each of our voices. It is time each of us steps up to the plate. At the very least we can teach the weak-hitting Dodgers a lesson or two!

Our clients have a right to a better answer than we know she is a witch because she either "looks like one" or because she weighs the same as a duck, which in turn floats on water like wood, which in turn burns like a witch. Might this involve hard work? I would suspect so, but isn't that what they pay us for?

Until next time…

In the next issue we will ponder more great scientific questions, continue with our development of logic, and have a wrestling update, as by January of next year the 2003 Giants will be old news. (But, Dodger bashing may continue because my hatred of that team is the ONE tradition I will defend to the death!) Oh, and some assorted serious fare for the more refined. Until then, best wishes to you and your families.

Ron

FEEDBACK

The *CACNews* prints letters to the editor that are of interest to its readers. We reserve the right to edit letters for brevity and clarity. All submissions to this page become the property of the *CACNews*.

Not Funny

Editor,

I just read the third quarter edition of *The CAC News*. As a member of the CAC for almost 30 years, I look forward to receiving it. However, I was quite dismayed with the publication of the joke An Apocryphal Tale on page 25. ASCLD/LAB inspectors and team captains are, for the most part, volunteers performing an important service for the forensic science community. It serves no purpose to publish something that demeans them. This mean-spirited Tale only highlights that some in the forensic science community do not understand the role of ASCLD/LAB, its staff and volunteers. Accreditation of crime laboratories is perhaps one of the most significant developments in forensic science in the last twenty years. Encouraged by judicial opinion, mandated by at least three states and implemented by crime laboratory directors, accreditation has brought needed regulation to our field.

While not the author of the Tale, I think you bear a responsibility as Editorial Secretary to publish a professional newsletter. Publishing something that demeans another forensic science organization and its volunteers and staff is shirking your responsibility to maintain the standards of *The CAC News*.

Frank Fitzpatrick, Chair, ASCLD/LAB

Presented at the American Academy of Forensic Sciences Seminar, Anaheim, CA, February 1984.

Editor's note: While Jan Bashinski wrote this article nearly 20 years ago, despite its references to ABO and enzyme typing, our readers will find the key concepts extremely timely and relevant.

The Criminalistics Laboratory Report: An Editorial View

Jan S. Bashinski, M Crim

ABSTRACT

Many forensic scientists regard their written reports merely as a means of recording their analytical results, rather than as vehicles for conveying their conclusions, in the belief that the courtroom, not the report, is the appropriate place for interpretation. However, critical decisions about the case may be made by others in advance of trial on the basis of the written report and without consultation with the criminalist. This paper puts forth an alternative view that the function of the laboratory report should be to communicate to its reader both the analytical results and the conclusions of the analyst, conveying the essence of what the expert would say if asked for his opinion in court. A number of hypothetical case examples are used to illustrate some important issues which should be considered in the preparation of a criminalistics laboratory report.

Most criminalists acknowledge that one of their fundamental professional responsibilities is to provide interpretation of their laboratory results. They accept the premise that their obligation as forensic scientists goes beyond conducting analyses and generating data to include the formulation of conclusions based on their analytical results and the presentation of those conclusions in the form of an expert opinion in court. The forensic science literature contains many articles regarding the role of the forensic scientist as an expert witness. Most of this literature deals either with the communication skills required in the courtroom(1,2) or with the problems encountered by the scientist in reconciling his standards of proof with those of the legal system. (3)

The emphasis given to testimony in the ethical codes of the various forensic science organizations also reflects the keen awareness criminalists have of the importance of their role as witnesses. However, other than the general exhortation to be accurate, honest, and impartial in testimony, there has been relatively little attention paid in the literature to the substantive content of the interpretations offered in court by forensic scientists. There has been even less consideration given to another very significant aspect of their work, that of communicating laboratory findings in the form of written reports.

One reason for the emphasis on testimony is the view held by many forensic scientists that their written reports are merely a means of recording results and that interpretive or conclusionary statements should be reserved for the courtroom. Written reports are rarely introduced as evidence when the expert is available to testify. Testimony is offered under oath before the trier of fact and, unlike a written statement, is subject to cross-examination. Naturally, it is to be expected that forensic scientists should take their responsibilities as witnesses very seriously.

It is entirely appropriate to focus on the courtroom as an important forum for communication of conclusions and to give careful and critical attention to testimony. However, ignoring the impact of the written report can have serious consequences which should not be discounted.

First, significant decisions about a case may be made in advance of trial by police officers and attorneys, based on their limited understanding of a laboratory report and without any contact with the criminalist. Although forensic scientists may encourage their "clients" to consult with them about the laboratory findings, there is no guarantee they will do so. An investigator may decide to eliminate a suspect from consideration or not to pursue a case at all based only on a sketchy report. A prosecuting attorney may elect to drop charges or a defense attorney may advise his client to plead guilty based on the report. A report may be accepted at face value in court by stipulation with no opportunity for the analyst to explain the results.

Since criminalists themselves often agonize over the interpretation of their own data, it should be anticipated that there is a significant risk that non-scientists will misinterpret a technical result, unless that result is very carefully explained in simple and unambiguous terms. It has been demonstrated (l) that juries and attorneys often misconstrue terms like "consistent with' and "indicates. While most expert witnesses are mindful of the critical importance of proper wording of conclusions in court, it is not so universally appreciated that attention to semantics can be even more critical in a written report, which has to stand on its own without benefit of explanation from its writer.

Secondly, the report is the vehicle through which the opposition may discover what physical evidence has been examined and what its potential significance may be. If the analytical data in a report are incomplete or if the criminalist has failed to provide a summary of his substantive conclusions derived from the data, a possibility exists that he will have omitted information which will prove critical at time of trial. Thus, the criminalist may have unwittingly obstructed the ability of the opposition to prepare its case. Furthermore, even though at the time of trial the expert witness may take great pains to present objective interpretations of the evidence and to offer is testimony in an impartial manner, a sketchily written report may give the impression of an attempt to hide or cover-up information of value to the other side. If, instead, the opposing attorney perceived from the analyst's report a willingness to consider both sides, he might be much less inclined to mount a full scale attack on the witness' credibility in court.

A basic ethical tenet of forensic scientists is that as witnesses they are not advocates in the trial—that their analytical results and conclusions should not be swayed or biased by the party who calls for their testimony. It is accepted that it is the duty of the forensic scientist to avoid misleading the jury by his testimony. Given the fact that the testimony is being elicited by an advocate, however, it is not uncommon to encounter a courtroom situation in which the scientist is unable to present his results in what he considers to be a fair and impartial manner. Although it is possible for an experienced witness to control his own testimony to some extent, the scientist is often confined to limited responses to carefully constructed questions and is somewhat at the mercy of the attorney examining him. This situation can limit the witness' ability to be as clear or specific as he would like. Including clear-cut statements of conclusions in written laboratory reports can help prevent manipulation or misstatement of those conclusions by the advocates (attorneys) in the adversarial atmosphere of the courtroom.

Finally, the mental discipline required to reduce a mass of analytical data to a concise, unambiguous conclusion can be of immense benefit in the performance of the laboratory work itself and in preparation for any subsequent testimony. Further, the process of verifying that all the conclusions are fully supported by the analytical data while the evidence is still available for additional testing is invaluable. Reflecting on the data allows the analyst to discover and rectify possible flaws or omissions in his work which he might otherwise discover, to his dismay, only the day before trial or worse yet while on the witness stand. Further, if the analyst takes the trouble at the outset to consider possible alternative interpretations of his data, and if he deliberates, carefully over his conclusions while the facts are fresh in his mind, there is little chance of his being pressured to produce hasty, ill-considered opinions in the stress of the courtroom situation.

It should be evident, for reasons such as those cited above, that it is important for forensic scientists to approach the preparation of their written reports with as much care and soul searching as they do their court testimony. The written report should serve to communicate both the analytical results and the interpretations and / or conclusions of the analyst. Furthermore, the conclusions expressed should convey the essence of what the criminalist would say if asked for his expert opinion in court, and should do so as clearly and unambiguously as possible.

Having taken the position that written reports should include both data and conclusionary statements interpreting the data, it is important to address in some detail the substance or content of the opinions that are put forth in those reports (and in court testimony as well). There are many styles of report writing, and there is undoubtedly more than one acceptable approach. It is not the purpose of this paper to review techniques of effective written communication. Rather, the intent is to identify some fundamental issues which should be considered by scientists, as they develop their own report writing philosophies, and by policy makers or managers, as they establish guidelines for report writing and review the work of others under their supervision. Toward that end, it may be instructive to consider some key questions in the context of hypothetical case situations.

Discussion and Case Examples

One of the most critical questions the forensic scientist should ask himself in preparing a report is —*How could bias or misunderstanding be interjected or inferred by the user of my report from the manner in which I describe (or choose not to describe) my findings?* The hypothetical cases described below illustrate by practical example some of the types of problems which may be created by an analyst's decision to offer interpretive comments in his report.

CASE EXAMPLE 1

One potential source of misunderstanding in the report is the use of statistical information. Much has been written of late about the potential for use (and abuse) of genetic typing data (5,6,7), and there is a tendency for serologists is to avoid incorporating this type of data in reports for fear that it may be misunderstood or misused in court and be given unwarranted weight by the jury. This example illustrates how a well intentioned attempt to avoid prejudice can have the opposite effect.

Example 1: A forensic serologist has been asked to compare an evidence blood sample with the blood of victim to determine if the victim could have been the source of the evidence blood. The sample could be typed only in the ABO system; the serologist finds that the evidence sample is type 0, as is the victim. He reports that both victim and evidence samples are type O, but makes no statement in his report about the incidence of type 0 in the general population, although he would willing to provide population data, if asked, in court. The prosecutor, being an intelligent advocate, asks the serologist the following questions:

Q. So you found type O blood?
A. Yes.
Q. And that is the same type as the victim?
A. Yes
Q. No further questions.

The defense attorney asks questions about the methods the analyst used to conduct the analysis and about the analyst's background and competence to perform the analysis, none of which elicit information about the frequency of occurrence of type 0 in the general population.

In this scenario, the jury has not been made aware of something which they may find highly significant. What they have not been told is that although the blood matches the victim it is also the same ABO type as half the population of the world. It could be argued that it is the responsibility of the defense attorney to point out the limited value of the ABO typing result, and in the scenario described above most competent counsel would be sufficiently well informed about ABO typing to be able to cross examine the expert properly.

However, taking the above example further, let us assume that for some reason the only genetic type which could be determined in the samples was Adenylate Kinase $(AK)_1$, and that both victim and evidence samples are AK type 1. Is it reasonable to expect the average defense attorney to know that AK type 1 occurs in over 96% of the general population and that the significance of the similar type in this case, as far as distinguishing the victim's blood from anyone else's, is minimal? If, on the other hand, the expert's written report and his direct testimony had included relevant genetic frequency data, it would have been clear to all parties exactly what the limitations of his conclusions were. Given that the stated purpose for omitting the frequency data was so as not to prejudice the case against the defendant, could it not be argued that in this case the forensic scientist had defeated his purpose by omitting the data?

CASE EXAMPLE 2

One strategy used by some criminalists to avoid any misinterpretation of their reports is to simply put all the analytical results in a table, without any interpretation or conclusions, in order to encourage the users of their work to contact them for details of their opinion. In a report writing exercise conducted as a part of a recent national symposium on the analysis of sexual assault evidence, almost half of the experienced serologists in attendance followed this practice(8). Unfortunately, however, the scientist usually has no means of ensuring that he will be consulted about his results. Furthermore, such a table of results can appear deceptively simple, leading an uninitiated reader to concoct his own, often erroneous, interpretation, as illustrated in the following example:

Example 2: A forensic scientist has been asked to examine a vaginal swab in a sexual assault case and compare his typing results with the types of the victim and suspect. He finds semen on the vaginal swab and goes on to develop typing data which he reports in tabular fashion, with no accompanying explanation, as indicated below:

Sample ABO PGM Pep-A
(subtype)

victim O(H) 1+ 1-1
suspect O(H) 2+1+ 1-1
vag swab O(H) 1+ 1-1

There is a significant possibility that an unschooled investigator or attorney might conclude from the fact that no PGM 2+ was found on the vaginal swab that the suspect has been eliminated as a possible source of the semen on the swab. The forensic serologist, however, would be aware of the possibility that all the PGM activity seen on the vaginal swab could be from the victim's own secretions and would tell the investigator, should he inquire, that this suspect was not necessarily excluded by these results.

The serologist is presumably aware that the reason he had been asked to do a typing test is to determine whether or not there is evidence tending to exclude the suspect. Would it not be simpler and more direct to have provided the investigator with the answer to his question in the written report in the first place? Could it not be argued that in leaving the investigator to interpret the data on his own, the serologist has not fulfilled his professional responsibility?

A slight modification of the analytical data in this hypothetical case produces a scenario to illustrate the opposite side of the coin- that **is,** the potential for misinterpretation of the laboratory results to the detriment of the defendant. Consider now a situation where the suspect, instead of having a PGM type 2+1+(different from the victim's) turns out to have be PGM type l+(the same as the victim's)

sample ABO PGM Pep-A (sub)
victim O(H) 1+ 1-1
suspect O(H) 1+ 1-1
vag swab O(H) 1+ 1-1

If the serologist reports (or, for that matter, testifies to) this data without offering any conclusions as to what group of persons may be excluded as possible donors of the semen on the vaginal swab, what kinds of questions might a hypothetical prosecutor ask the serologist as he presents his direct testimony ? The prosecutor will undoubtedly inquire if it isn't a fact that the typing results on the vaginal swab match the suspect. He may even ask the expert how commonly the combination of Type O, PGM l+, and Pep-A 1-1 is found in the general population. He is certainly not likely to ask if a semen donor of any type, other than O, PGM 1+, Pep-A 1-1 could have been eliminated based on these tests, nor is he likely to make a point of the fact that all the results obtained on the vaginal swab could have come from the victim herself. If the serologist hasn't stated clearly in his written report that he could have gotten these same results *regardless of the type of the semen* (because all the typing results could be due to the victim's own secretions), there is an even greater chance that point will also escape the defense attorney, and that unwarranted significance will be given to the typing results by the jury. In that event, hasn't the serologist, by his inaction, allowed bias to be interjected into the presentation of his results?

CASE EXAMPLE 3

In many instances, forensic scientists are asked to examine items for evidence of common origin. Typically, a number of chemical and / or microscopic similarities observed between the known and questioned specimens are regarded as evidence that both may have originated from the same source. As illustrated in the next example, however, it is often far from obvious just how significant such similarities may really be.

Example 3: A criminalist is asked to examine fibers combed from the hair of a robbery suspect and to compare these fibers with a stocking cap discarded by the robber along his path of flight from the scene. The evidence cap is composed of blue acrylic fibers and the examiner also finds many other extraneous fiber types on the inside surface of the cap. In the fiber sample collected from the suspect's hair, the examiner finds many different fiber types, most of which might have come from knit caps but do not match any fibers from the evidence cap. He also finds half a dozen blue fibers of the same type as those of which the evidence cap is composed.

Should the criminalist report, without comment, merely that he found six blue fibers in the suspect's hair that matched the cap? Or should he also mention the other, non-matching fibers and attempt to communicate in some way that the significance of the matching blue fibers as far as indicating contact between the suspect and that particular hat may be diminished by the *lack of correspondence* of the other trace evidence found?

CASES 1 and 2 represent situations where the analyst probably has a good idea of the significance of his findings; CASE 3 is a situation where he may not. All three cases illustrate the problems which may surface if the forensic scientist makes no attempt in his report to articulate an opinion as to the probative significance of his analytical results. Clearly it is not appropriate for an expert witness to invade the province of the jury and express an opinion regarding innocence or guilt. It is, however, entirely proper for the witness to adequately inform the jury of the limitations of his results so that the jury may make an informed decision as to how much weight to give them. Further, it is as appropriate for these limitations to be included in the written report as it is for them to be described in testimony.

This last statement leads to consideration of a second important question—*In a borderline situation which does not lend itself to a definitive "yes or no" conclusionary statement, how should one report tentative conclusions—or, for that matter, should one report them at all?*

Not so long ago, there was a furious debate (9,10,11,12) in the International Association for Identification over Resolution VII, which stated that any certified latent print examiner who reported a "possible, probable, or likely friction ridge identification" would be stripped of his certification. This resolution codified the belief of many identification persons that there is no such thing as a valid tentative conclusion, particularly as applied to the "exact science" of latent print comparison. Many firearms examiners also subscribe to the philosophy that a comparison should result in a yes or no conclusion. Others acknowledge that there are situations where there may not be sufficient similarities or differences between two specimens to support an unqualified yes or no, and that some tentative statement may be warranted in these cases.

Assuming that one agrees that a "yes or no" answer in a firearms comparison is not always possible or appropriate, what are the possible types of reports which may be issued? In a borderline situation, should the examiner simply report that the examination is "inconclusive"? Or should he try instead to explain what the term "inconclusive" means to him in the context of the case at hand?

Examples of situations where one might draw tentative conclusions about a bullet comparison are:

(1) The bullets are too badly damaged or the suspected weapon does not make sufficiently reproducible marks on the test bullets to permit a comparison. That is, although the class characteristics are the same, not enough data is present to support any opinion as to whether or not the bullets were fired from the same gun.

(2) Some similarities are observed between the two specimens, above and beyond consistent class characteristics, but they are not sufficiently numerous or distinctive to support a positive identifi-

cation. In other words, there is some evidence they were fired from the same weapon, but the examiner is not certain that they were.

(3) No significant similarities, other then class characteristics were found between the specimens, and some possibly significant differences were observed, but these differences were not sufficiently distinctive to support an exclusion. That is, there is some reason to believe the bullets were fired from different weapons but the examiner cannot be certain that they were.

The obvious differences between these three tentative conclusions could prove to be very significant to the ultimate outcome of the case. A vague term like "inconclusive" technically encompasses all of the above interpretations, but would convey essentially no information to clarify the issue for the reader of the report. If the purpose of the report is to provide information to the reader, wouldn't that purpose best be served by describing the examiner's opinion as precisely as possible?

Having asserted that the scientist's report and testimony should include an assessment of the significance of his results, the final key question obviously is *How does one go about assigning a significance to his analytical results?* This question is, of course, the most difficult of all to answer.

In many of the case situations routinely faced by forensic scientists, such as the scenario of the robber's cap, relevant statistical data are not available. Even if one constructs experiments to generate data on the persistence of transferred fibers, or, if one determines the population frequencies of various fiber types in stocking caps, one cannot reconstruct, in most cases, the history of exposure of the suspect to various fiber sources. The criminalist may remain, therefore, unable to interpret the significance of a match in a case such as this.

This state of affairs may leave the criminalist with a sense of discomfort, but surely does not relieve him of the responsibility to attempt to develop appropriate data at every opportunity and to use that data *responsibly* as it becomes available.

In some subject areas, such as serology, there is a wealth of statistical data which can be brought to bear to answer certain questions— How common is this set of types? How effective is this particular typing system in discriminating between random persons, etc.? In basic quantitative drug analysis, there ere simple, well-defined methods of evaluating the accuracy and precision of data. However, even if the analysis is of a sort which produces data which can be quantified or verified objectively, some subjective judgment is generally required in deciding whether or not the data are sufficiently compelling to support a definitive conclusion.

CASE EXAMPLE 4

The following case provides an example of a situation where the criminalist may not be able to produce a numerical assessment of the significance of his observations but may have practical "common sense" experience upon which to base his interpretation of the evidence:

Example 4: A criminalist has been asked to examine articles of clothing belonging to the victim and the suspect in a rape case for trace evidence; that is, he has been asked to look for some evidence the garments had been in contact with each other. The suspect's clothing is a jumpsuit which is covered with large smears of paint of many different colors that flake off onto the examination table whenever the garment is touched. The victim's sweater is multicolored deep pile angora knit. Upon examination of the items under the stereo microscope, he does not observe any paint flakes on the victim's sweater or any angora fibers adhering to the rough surface of the cracking paint smears on the suspect's jumpsuit.

Given the nature of the two garments and their potential to produce and retain transferred trace evidence, the examiner might conclude that he would expect to find transferred trace evidence if the garments had been in intimate contact with each other. If that is his opinion, should he report only that he found no transferred trace evidence? Or is it appropriate that he elaborate and state that, based on his observations, he considers it unlikely that the two garments had been in close contact? In other words, is it not his responsibility to interpret his findings in the light of the initial question he has been asked to answer?

Some forensic scientists maintain that they must avoid making interpretive comments because they do not possess all the data which may have a bearing on their interpretation. Yet, these same analysts formulate opinions every day, which may have to be modified years hence as the state of the art in the field advances. Five years ago, a serologist may have offered the opinion, based on conventional PGM typing, that two blood stains were the same type and could have had the same source. Today, he might perform a PGM sub-typing test on these same stains and develop conclusive evidence that the two samples are definitely different. Does that mean he was "wrong" to draw his original conclusion? Or does it mean merely that even the very best interpretation of a given piece of analytical data may contain some element of uncertainty which only time and future research will make clear?

Conclusions

The hypothetical cases discussed illustrate the value of a written report which incorporates both the analytical results and the analyst's conclusions as to their significance. This style of reporting, by making clear both the value and the limitations of the analysis, allows the user of the report to assess the case intelligently with a minimum of confusion. Further, the discipline the analyst exercises in evaluating the significance of his results and examining alternative explanations for his findings long before being "put to the test" in court cannot fail to have a beneficial effect on the overall quality of his analytical work and, ultimately, of his testimony.

Attributes of a scientist include the ability to draw a reasonable conclusion based on available data. The scientist's decision-making process includes a willingness to qualify his conclusion in light of the level of uncertainty of the data as well as to justify (and, in that sense, advocate) his conclusions when challenged. Clearly, a scientist should not formulate a conclusion without sufficient data or expertise, and if he is ethical and competent he will refuse to do so. It is the question of where to draw the line as to what constitutes sufficient data or expertise which usually causes the most consternation in the courts.

The fact that there may be a degree of uncertainty in his conclusions should not deter the forensic scientist from rendering expert opinions or from articulating those opinions in his written reports. It should, instead, inspire him to work very hard to define the limitations and uncertainty in his work. Awareness of his own limitations should motivate him to find ways to communicate to the ultimate users of his work, the jury, his best judgment as to what the degree of uncertainty in his analysis really is. Only in this way can he help the jury weigh his opinions appropriately, along with all the other information before them, to make the ultimate decision about the truth of the matter in the case at hand.

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Fall CAC Seminar, Oct 7-11, 2003

Celia Lukomski (858) 467-4633 or Jeanne Parsons (858) 467-4520

Glass Breaking Experiments

U.S. Army Proving Ground, Yuma, Arizona

Types of panes tested included ordinary float commercial window pane, 1' x 1' x ¼" (float side opposite breaker); Activ™ Glass by Pilkington, 1' x 1' x ¼" (treated side towards breaker); and SunClean® Glass by PPG, 1' x 1' x ¼" (treated side towards breaker).

The cover of this issue of *The CACNews* depicts stills captured from a stream of high speed video taken during experiments at the Yuma Army Proving Ground in Dec. 2002. We made high-speed videos as we broke panes of "self-cleaning" window glass. The highspeed videos were shot at 1000 frames per second.

The glass breaker was Corrie Maggay. Corrie is an intern in my lab, and she is also an MS in Forensic Science candidate at National University in San Diego. I'm an adjunct professor

there. The glass breaking study is a part of Corrie's thesis project, and I'm her thesis advisor. Faye Springer is collaborating with us on this.

Each time Corrie broke a window, we would then have her step over to an area where we had laid down clean butcher paper. Brandon Armstrong and I would help Corrie remove her outer clothing and we would package each item as evidence. Later, after we had returned to San Diego, Corrie came into my lab and examined the clothing in each of the packages and picked off the glass fragments. These were tallied and separately those fragments from each clothing item was packaged and sent to Faye. In Faye's lab she will try to determine what percentage of the glass fragments that came back towards Corrie and were collected originated from the surface of the glass that was towards the breaker (towards Corrie). For the self-cleaning glass types the surface towards the breaker was always the treated or exterior side of the glass (opposite the float side).

Corrie will be presenting her results at the fall 2003 CAC Seminar in San Diego and will show the audience most of these photos plus the high-speed videos. Corrie will also be presenting at the 2004 AAFS Annual Meeting in Dallas in February and at the 2004 Pittcon in Chicago in March. Hopefully by then we will have Faye's results.

—Bob Blackledge

Leadership 101

Teamwork

Second in a series.

By Ron Nichols

Preface: Before we venture forward into the next installment of Leadership 101, I would like to take some time to introduce more of myself with regard to issue of leadership as I did when I presented some of my forensic background in last issue's editorial. After all, I certainly do not want to give the impression that I am a self-proclaimed expert using his position as Editorial Secretary to qualify myself to speak on this topic. Let me briefly provide my credentials and then you can decide whether to give merit to what I have to say.

Upon my acceptance of supervisory responsibilities with the Oakland Police Department laboratory in 1991, I became very aware that my education and training as a forensic scientist did not equip me to handle the demands of this new task. So, I went back to school and attended workshops and seminars that dealt with people, personality styles, management and leadership. I pursued this all the way through a Master's degree that, while from a well-recognized seminary, permitted me the opportunity to focus all of my work towards the issue of leadership. In addition to my education and training, I have instructed at a private, accredited college and have provided workshops, seminars, and presentations dealing with leadership, including one on Servant Leadership at the 2002 AAFS Meeting held in Atlanta. In addition, I have served in supervisory positions, served on the BoD of the CAC on several occasions and have served on boards of private organizations as well.

* * *

ONCE AGAIN WE VENTURE into our discussion on leadership and what might be referred to as some of the more essential elements. In the last issue I talked about the dangers of a pattern of detachment developed through a career and the necessity to develop some attachment when promoted to a laboratory management position. If you have not read the article, I encourage you to go back. It sets the foundation for much of what will be discussed in the coming segments.

This segment will be concerned with the concept of teamwork. Take a minute and ponder the concept. If you have to, close this issue! Just make sure to come back to it. Write your concept down and then let's see how it may or may not change with the coming discussion.

What was your first inclination? Did it involve sacrificing for the good of the whole? Maybe it had a more positive bent, such as working together to achieve the goals of the whole. Similar to the first, maybe it consisted of something similar to subordinating personal goals for the common cause.

We do need to recognize that there will be many different definitions depending on what we have learned, how we have learned it, traditions we hold, our personalities, and sometimes our current environment. (I say "sometimes" because we may cling to a definition of teamwork despite our current environment.) But, regardless of the definition, there is always an individual element and a group element.

Sports are an obvious analogy that has value in this discussion because within the sports arena, different types of teams are evident. One type of team is one in which the members of the team have basically the same skill set such that having a position on the team is not characterized by skill set, but rather by something else such as weight class in wrestling. When I refer to wrestling I do not mean the entertainment version featured by television but rather the sport from which Olympic champions are made and the sport in which my teenage son has made a niche for himself.

Even in a highly individualized sport such as wrestling, there is a team component. Each team has a single wrestler in each of several weight classes. Each of these wrestlers competes against the wrestler from the other team within the same weight class. The winner not only gathers a positive statistic for his own personal record, but also based on the level of victory, scores victory points for his team. When all wrestlers have competed, the scores for each of the

teams are totaled to find the winning team. This team concept is referred to as a dual event.

Now let's use my son as an example. Mike recently competed on the varsity team as a sophomore in high school and regularly weighed in at approximately 152 pounds. However, since only one wrestler could compete in each weight class for each team at dual events, the senior wrestler who also weighed in at the same weight as Mike received priority. Therefore, Mike was asked and assented to competing in a higher weight class, 160 pounds. At that weight, Mike was the best the team could offer even though it was not the optimum weight for him.

Early in the season, the team experienced much success. Mike's personal .500-record, though not as good as he became accustomed to, was helpful to the cause. He won some matches and when he lost, he generally remained close enough in overall points such that the team points for the other team were kept to a minimum. About a third of the way through the season Mike's 152-pound teammate suffered an injury. When competing at that weight, Mike's record was 15-3 and while his losses were close, many of his victories were completely dominating. The team continued to do very well. The season ended with Mike returning to the 160-weight class after the injured senior came back from his injury.

Mind you, I am not bemoaning the fact that my son had to wrestle outside his weight class! He did very well this year both inside or outside his weight class. Simply, this was an example of sacrificing for the good of the whole and subordinating personal goals for the common cause. It worked and it was necessary for the success of the team because of the type of team it was.

Another type of team may have different characteristics. For a wrestling team, all of the members had similar skill sets. For a football team, hockey team, or baseball team not all members have similar skill sets. Many of the positions on each of these teams are highly specialized. If the quarterback got injured would you replace him with a linebacker? If the goalie on a hockey team got injured would you replace him with a defenseman? If a pitcher got injured, would you replace him with an all-star outfielder simply because that all-star was your best player? The answer in each of these three questions is no! In each and every instance, an individual with a similar skill set would be used to replace the injured player even if the ability of that individual is not as great as other members of the team.

So, while the linebacker, the defenseman, or the outfielder could be called to sacrifice and subordinate personal goals, doing so in these instances would not further the cause of the team. In fact, having this sacrificial definition of teamwork could actually harm the team as a whole. As valid as that position was for the coach of a wrestling team, it would be completely inappropriate for the coach of a football, hockey, or baseball team.

Regardless of what we may currently hold as our definition of teamwork, if it has not been formed given consideration to some important issues, it may be time to revisit it. The first issue is the type of team for which we have been given responsibility. Depending on the size of a forensic laboratory, the structure may be similar to either of the two types of teams discussed earlier above or a combination of the two. For example, in small laboratories, it is expected that there will be a few individuals at each specialty such that a leader may be responsible for people with diverse skill sets. In larger laboratories it is quite possible that a leader may be responsible for a discrete group with only one or two skill sets. Yet, there may be several such leaders within the laboratory.

So, is the team we are responsible for a type of team that has similar skill sets in which many of the individuals can be interchanged? Or, is it a type of team that has highly specialized components in which most to none of the individuals can be interchanged. (Note, that I refrained from using a common term when discussing issues such as these. A team consists of individuals, people with individual personality styles, feelings, dispositions and behavior patterns. At no time should they be referred to as parts.)

Along with this assessment we need to examine the mission of the team, along with related objectives and goals. The team must have a focus. It must be a focus into which each and every individual within the team can invest. Without a focus, the team will be rudderless. Without an opportunity to make a meaningful investment, an individual will seek another team.

Based on the type of team for which we have been given responsibility, our approach towards leadership of that team may be different. For the type of team in which skill sets are similar, at times it will be appropriate and necessary to interchange individuals to attain the mission, objectives, and goals. However, we need to keep in mind that continuous calls of sacrifice will create discontent. At times, circumstances call for sacrifice as in the case of my son's injured teammate. Continuous calls for sacrifice are simply the result of poor planning on the part of leadership.

Planning is an essential part of teamwork as shown above. It is even more highly critical for teams in which specialized skill sets are present. Calling on individuals to sacrifice by working outside their area of expertise does harm not only to the individual but to the team as well. Calling on individuals to be pulled from an area in which they excel to continually assist in an area that is unchallenging to the skill set and experience they have attained is harmful to the team. Prolonged behavior in this manner will eventually make the team impotent to complete its mission, objectives, and goals.

Whatever definition of teamwork we may develop, it has to take into consideration the type of team, the mission, objectives and goals of the team and planning. In addition to these critical elements one also has to recognize that the team is composed of individuals each of whom plays an integral role. (If the role is not integral to the team then the role should be eliminated.) Therefore, even though we are trying to develop a definition for teamwork, it has to include the recognition that there is an individual component and that each role is an integral part of that team.

Given that fact, each member of the team needs to be fully equipped to do the best job for the team. Part of this equipping is material, but a good portion of it is far less tangible and requires a relationship with the team leader to fully develop. Equipment and supplies are nice, but they are poor motivators. What motivates people above and beyond their normal capacity is a positive personal influence character-

Leadership 101

ized first and foremost by respect. In this environment, an individual is not only able to respond to praise, but also to positively respond when corrective action is necessary. Therefore, the definition of teamwork should also incorporate the issue of equipping the members.

Finally, the definition has to include accountability. Each member of the team, as well as the leader, needs to be accountable for his or her performance and actions. Each individual is responsible not only to the team as a whole, but also each individual member within that team. It is expected that when a team member has been given the necessary resources to do the task, that the task gets done. If it does not, the leader has a responsibility not only to the team but also that individual to determine the reason(s). It could be that the person, despite having the necessary resources, does not have the aptitude for such a task. If that is the case, it may become necessary to switch positions. It could be that they really have the desire, but lack the necessary skills and ability. A leader is doing no one a favor by keeping an individual in a position in which he or she will continually fail to perform well. Just because an individual wants to be the quarterback does not mean they have the skills to be one.

This is one of the most difficult things a leader will ever have to do. Confrontation is tough. Trust me, I have learned that lesson over and over. But even tougher are the ramifications that will erupt when a proper confrontation is not undertaken. Confrontation is tough but lack of confrontation can lead to disaster. So how can we have successful confrontation? Well, first we have to be certain that we DO NOT define a successful confrontation by whether or not we win.

We can have and measure a successful confrontation by a couple of characteristics – personal relationship and respect. No one has to be best friends with the people they supervise, but there has to be a good personal relationship. When people know that we care and we truly have their best interests at heart, they are much more willing to address potential performance deficiencies. Secondly, no confrontation will work unless there is respect. For a leader, it is important to act with integrity and honesty so that the team member will be able to have confidence in what the leader is saying and doing. A team member has to act in a similar fashion. Personal relationship and respect are necessary foundational elements for a confrontation. In addition, if they still exist at the end of the confrontation, then it has indeed been successful.

So, what is the definition of teamwork? There is no one right definition. But there are essential elements that should be evaluated and incorporated into the definition as necessary. For whatever team we are responsible for, we should be examining the type of team and its relationship to the team's mission, objectives and goals. It is necessary to recognize that the team is composed of individuals and that one of the primary responsibilities of the team leader is to equip those individuals, in more than a material sense. Finally it has to include accountability based in an atmosphere of personal relationship and respect.

President's Desk, *cont'd*

credibly experienced Criminalists to retirement. They will be taking their hard earned and irreplaceable experience with them when they head out the door in the next year or two. No one but the accountants will benefit from their departure. And there is nothing for us to gain with they take their experience with them. That is, unless we seize the opportunity to do something about it.

Excuse me while I get up on my 'soap box'. I'd like to throw down the gauntlet to everyone who reads this article. Every senior Criminalist, fingerprint examiner, crime scene investigator and manager who plans on retiring within the next year or two has a duty to leave behind their wisdom and experience for the younger members. Don't wait for them to seek you out and ask for your leadership. Instruct them, lead them and inspire them. But for heavens sake, do something with your hard earned experience. If you don't pass it down it will be lost forever.

And, it is every young members duty to seek the council, wisdom, advice and experience of those who will be leaving us soon. To do any less is a damn shame. To have them bury their wisdom only to have you rediscover years later only delays the time when we will become as proficient as we can possibly be.

Don't let your ego get in the way of learning. Learn from the experience of others so that the lessons they learned will not have to be repeated with you. Their effort is now your gain and will ultimately impact the very profession we support, the criminal Justice system.

Thanks for listening. I look forward to seeing you in San Diego.

Raymond

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Which Came First, the Blood or the Print?

The Rest of the Story

In the last installment of POL, we related a case wherein the expert was asked to opine which of two pieces of overlapping evidence was deposited first, a bloodstain or a palm print. The expert responded that the blood came first, followed by the palm print. This was devastating to the defendant, whose palm was determined to be the source of the print. Recall that the blood was deposited on a ceramic bathtub, dusted with black powder, lifted with fingerprint lifting tape, and placed on a white print card. This was the evidence used by the expert to determine the order of deposition.

The expert was asked the criteria by which he was able to conclude the order of deposition of these two evidence items. He responded that

1) the blood was "cracked," indicating to him that significant pressure had been placed on it;

2) some ridge detail exhibited an endpoint within the stain, rather than traversing both boundaries of the entire 1 mm stain;

3) he saw fingerprint powder in the cracks of the blood drop, indicating to him the presence of oils on the stain.

When challenged, the analyst could provide no supporting literature in which these criteria were established, but said they were taught at an FBI class.

A defense expert reviewed the case. He was not convinced that the print was necessarily deposited after the blood spatter, and he performed some experiments to test his hypothesis. He spattered some blood on a ceramic surface and watched it dry. Without any disturbance whatsoever it developed a cracked and crazed pattern, merely as a consequence of drying on this particular surface. Next, he dusted the spattered bloodstains with fingerprint powder. In the absence of any prints, either underneath or on top of the blood spatter, he observed that fingerprint powder infiltrated the cracks of the dried stains, and that "snow-fencing" of the powder against the stain concentrated the powder on one side. This created the illusion of a ridge overlapping one edge of the stain. Every criteria used by the expert to conclude order of deposition could be re-created in the absence of any latent print at all!

To complete the experiment, the criminalist then spattered blood on top of previously deposited prints and also applied prints on top of a fresh spatter pattern. In both instances he could find drops that either did or didn't show the apparently distinguishing characteristics observed in the case evidence.

From the results of the experiments, he devised a test that he challenged several of his colleagues to take. Everyone who agreed to take the test felt that they could tell whether blood or a print had been deposited first. He chose several examples that represented each of the possible test situations, and included instances in which the appearance of the spatter either supported or refuted (according to the criteria that these experts agreed were accepted by practitioners) what he knew to be the order of deposition. Of the five IAI-certified fingerprint examiners who took the test, no one had less than 10 years of experience, and the most senior examiner boasted 25 years of experience in fingerprint examination and comparison. The best score was 80% right, while the worst was 80% wrong – worse than guessing!

We published last quarter (Inman and Rudin, 2003) the stains used to test the examiners. Apparently none of you were quite so brave as those five examiners who originally agreed to take the test – hopefully a testament to progress in criminalistics. We now provide the key for the order of deposition of the blood and print for each sample. We leave to the reader the joy that comes from correlating the key with the photographs from the previous issue of *The CACNews*. The original evidence photograph is unfortunately no longer available for comparison.

Photo	Key	Photo	Key
B6	B1/P2	***B8***	B1/P2
B7	B1/P2	***B10***	B1/P2
B4	B1/P2	***C2***	P1/B2
B9	B1/P2	***B5***	B1/P2
C3	P1/B2	***A2***	B1/P2
E10	P1/B2	***C5***	P1/B2
E9	P1/B2	***D6***	P1/B2
C1	P1/B2	***D7***	P1/B2
A3	B1/P2	***A1***	B1/P2
D8	P1/B2	***C4***	P1/B2

B1/P2 = Blood first/print second

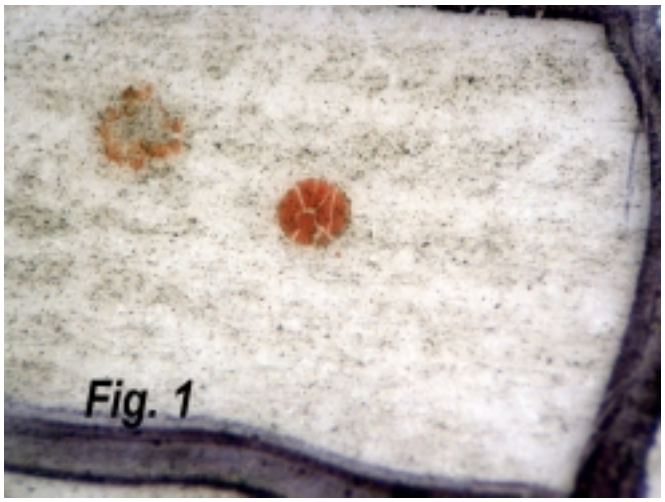
P1/B2 = Print first/blood second

We provide the following informal summary of (unpublished) experimental observations to illustrate different ways the pattern observed in a bloodstain might be created. In its present form, the information is intended solely as a source of contemplation and some intellectual amusement over your lunch—or perhaps as a stimulus to further experimentation of your own.

We use the lessons learned from this case as a caution against the *ad hoc* interpretation of nominally obvious physical evidence (hey, we've all done it!). Experimentation is required; we may not elevate our assumptions to conclusions without the requisite blood, sweat, and tears – and a bit of black powder.

Pizzola P.A., Roth S., De Forest P.R. *J Forensic Sci.* 31(1):36-64, 1986
Inman, K., and Rudin, N. Which Came First, the Blood or the Print?

The Role of Experimentation in Forensic Casework. *The CACNews* 3rd Quarter, 2003, pg. 26



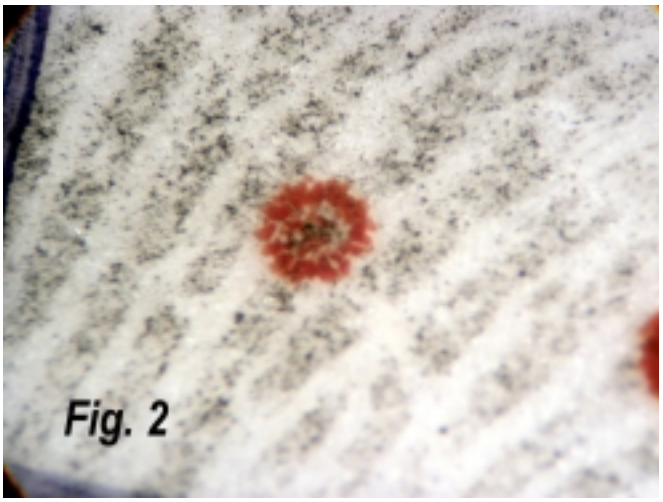


Figure 1. The stains in figure 1 were prepared by depositing the bloodstains, then depositing a palm print. They were then dusted with black powder, and lifted with fingerprint tape. Powder appears to be randomly distributed across both bloodstains, and no clear "ridge" can be detected running over the blood droplets. Three out of four experienced analysts declared that the print came first, followed by the blood. The fourth analyst made the same call, but was not certain, and would not have reported an order of deposition.

Figure 2. The stain in Figure 2 was prepared by depositing a palm print first, followed by blood droplets. They were then dusted with black powder, and lifted with fingerprint tape. The powder appears to run over the blood, along the "ridge" of the latent print. All four analysts declared that the blood was deposited first, followed by the print.

Experimental observation/Derivation

Cracks in the stain

All spatter dried within seconds to minutes of deposition on the porcelain. All of the stains were cracked or crazed, and all stains showed a concave center. This type of involution was reported by Pizzola (1986). The mere act of drying caused the stain to crack into pieces. Close inspection of such droplets indicates that the involution forms upon impact, and the cracks result from drying.

Powder in the cracks

Stains dusted in the absence of any print showed powder infiltrating both the cracks and the involution.

Ridges over the stain

Dusting small dried stains in the absence of any print showed "snow-fencing" on one edge of the stain. This created the appearance of a powder-defined ridge starting up the side of the bloodstain, and continuing partway across.

Lifting of the stain

For virtually all of the blood droplets lifted, only a portion of the stain was removed by the lifting tape. The portion removed tended to be the outer rings of the involution. While powder particles trapped between the bloodstain and the tape were picked up, other particles were left behind, along with some of the blood. Clearly, the stain pattern removed by the lift did not represent the entirety of the original evidence pattern observed on the porcelain.

A Tucson, Arizona Flare Experiment

*Jeff Corey, Frank Powell, Tom Quesnel, Lisa Windsor and Victor Yanez**

Introduction

Recently, the Tucson Police Department in Arizona experienced two separate squad car trunk fires, each occurring about 15 days apart. Both of the fires occurred in the evening hours: one at 11:30 p.m. and the other one at 2:30 a.m. The first squad car fire originated on the right side of the trunk, where a box of flares was stored. The second squad car fire was discovered after the officer saw and smelled smoke. When the officer opened his trunk, he discovered a box of flares on fire located on the left rear side of the trunk. Fire Investigators are attempting to determine if sudden flare box ignition or electrical sources, the only two possibilities, caused the fire.

This puzzling scenario led to a joint effort between the Tucson Fire Department Fire Investigators, Tucson Police Department Crime Lab Criminalists, and the Tucson Police Department Arson Detectives Unit to conduct a series of experiments in order to determine whether the box of flares caused the fires.

Highway flares (fusees) use a friction ignition system (1). The fusee uses a two-part igniter; when the two surfaces are rubbed together, a flame is produced and the main composition is ignited (1). For the purpose of this paper the words igniter tip and igniter button will be used interchangeably. The parts of a National Flare Company 15 min. Red Fusee are labeled in Figure 1.

*Tucson Police Department 270 S. Stone Avenue Tucson, AZ 85701 and Tucson Fire Department 265 S. Church Tucson, AZ 85701

Materials and Equipment Used

1. Thelco Precision Model 16 oven (temperature range to 200°C), placed under a safety hood
2. VWR Traceable Digital Thermometer, placed into the oven to monitor the precise temperature inside the oven
3. Several 15 min. Red Fusees from National Flare Company, One fusee was notated as Listed 912 AU 3472 44AM, M1-2000-0518, Made in China. See Figure 2.
4. MSDS for the Fusee were obtained from the National Flare Company website at www.nationalflare.com
5. MSDS for potassium perchlorate, strontium nitrate, and sulfur were obtained from J.T. Baker and Fisher Scientific websites at www.jtbaker.com and www.fishersci.com respectively.
6. Products sheet and Product Use Instructions were obtained from the National Flare Company website.

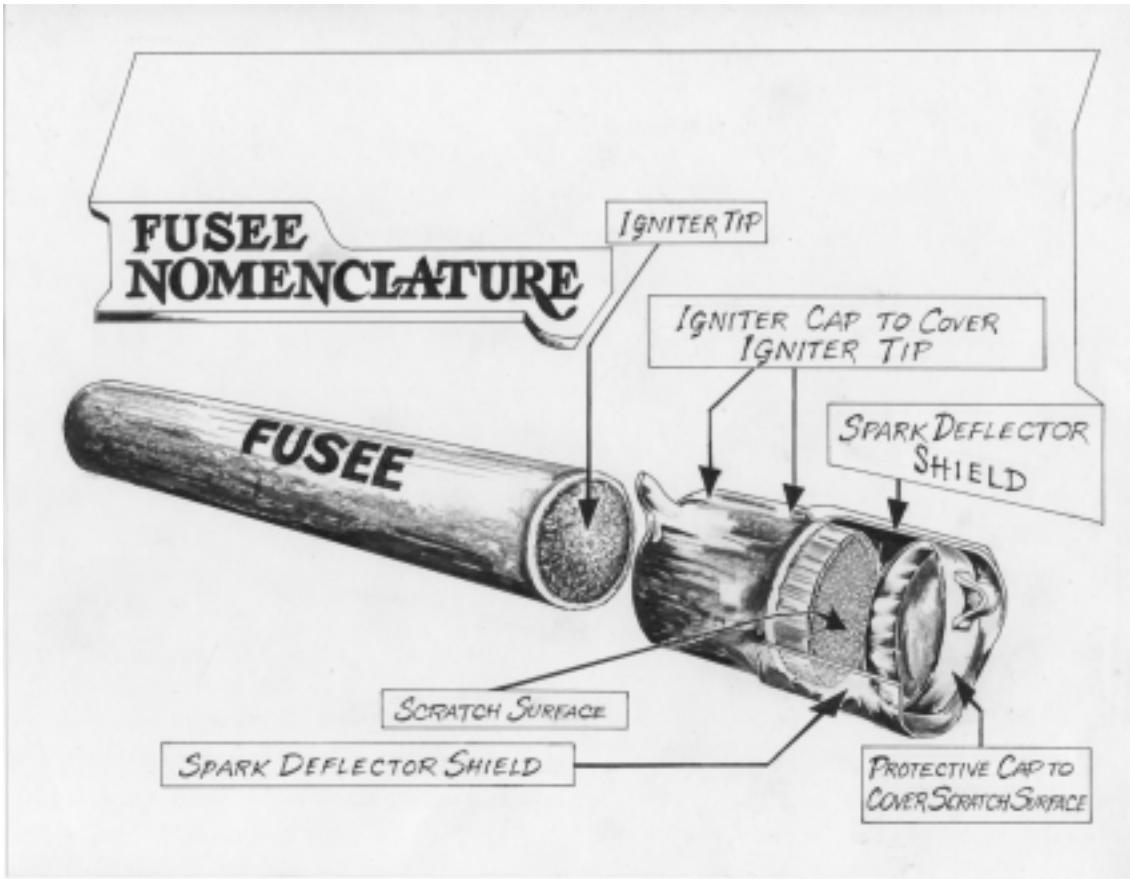


Figure 1

Experimental

Experiment 1

The igniter tip of the Fusee was cut off and placed into a porcelain crucible. The crucible was placed under the hood and lit with a match. This experiment showed how the igniter tip works for the Fusee. A bright white flame is emitted, eventually turning into a red flame.

Experiment 2

The igniter tip of the Fusee was cut off and placed into a porcelain crucible. The crucible was placed into the oven with an initial temperature of 125°F. The temperature was slowly increased to 240°F. According to the MSDS, the Fusee can become unstable at temperatures greater than 167°F. However, no ignition occurred. At this point, along with the fact that both fires started during the evening hours, the group determined that temperature, which includes heat transfer from the exhaust system, was not a relevant factor in causing ignition of the flare box.

Experiment 3

The Fusee body was cut with a scalpel and a 1 cm portion of the Fusee body was obtained. The powder from the Fusee body was placed into a porcelain crucible. The crucible was placed under the hood and lit with a match. The powder did not burn when it came in contact with the match flame.

Figure 2

Figure 3

How to use this Fusee, per National Flare Company instructions:

1. Remove protective cap to expose scratch surface.
2. Pull off igniter cap to expose ignition tip of fusee.
3. Hold at center of fusee tube, away from tip.
4. To ignite, scrape fusee against scratch surface while using spark deflector to shield face/body from sparks.

Figure 4

Figure 5

The conclusion drawn from this experiment is that the match flame does not burn long enough and/or reach the temperature required to ignite the powder. There were thoughts about the charcoal and the sawdust igniting spontaneously (2), but they were quickly dispelled when it was discovered through textbooks that the Fusee contained minimum amounts of both ingredients (1,3).

Experiments 4 – 7 were conducted outside in the parking lot between the Tucson Police Department and the Tucson Fire Department. The temperature outside was approximately 100°F.

Experiment 4

The igniter cap was removed from the Fusee, exposing the igniter tip (See Figure 3). The Fusee was dropped onto a concrete surface, on its igniter tip, repeatedly. To the amazement of the group, nothing happened. No smoke, no crackle, no pop.

Experiment 5

The igniter cap was removed from the Fusee, exposing the igniter tip. The Fusee, with its igniter tip contacting a concrete surface, was repeatedly scraped against this surface. The igniter tip cracked and popped; but no smoke appeared. Eventually, the igniter tip rubbed off and disintegrated. No ignition occurred.

Experiment 6

In this experiment, two Fusees were used. The igniter caps were removed from each Fusee, exposing the igniter tips. This time, the two Fusee igniter tips were repeatedly struck together and also repeatedly rubbed together. No ignition occurred.

Experiment 7

Again, two Fusees were used in this experiment. The protective cap that covers the scratch surface was removed from one Fusee (See Figure 4); and the igniter cap was removed from the second Fusee, exposing the igniter tip. The exposed igniter tip was softly scraped against the scratch surface (See Figure 5). It was observed that a very soft scrape against the scratch surface was sufficient to ignite a Fusee. Ignition occurred in approximately 25% of the attempts. Our observations indicated that the Fusee could ignite with relative ease. In fact, it was astonishing to see how easily the Fusee could ignite when the right circumstances were presented.

It was also observed that the scratch surface sometimes peeled off and transferred onto the igniter tip. Under these conditions, when the Fusee was dropped on its igniter tip onto a concrete surface, ignition sometimes occurred.

Discussion

The group quickly realized that this could be a possible scenario of why the fusee ignited in the vehicle trunk and caused a fire. According to some in our group, it is a common practice for officers at scenes requiring flares to prepare them in advance by removing the protective caps from both the igniter tip and from the scratch surface, in essence, exposing the igniter tip and the scratch surface in the anticipation for the need of additional flares. Frequently, if these flares are not used, they are returned to the trunk of the squad car with the caps removed, thus creating a possible scenario like Experiment 7.

To validate our suspicions, a random inspection was conducted on the trunks of several squad cars. It was found that some Fusees were uncapped, thus exposing the igniter tips and some of the protective covers from the scratch surfaces had also been removed. In addition, loose flares were observed in the trunk. Furthermore, it was also noted that the box containing the Fusees was stored improperly amongst equipment and supplies. It was duly noted that human error is the biggest danger.

During the search of the trunks, a second type of flare was found similar to that shown in Figure 6. The plastic lid was removed from one flare to expose the scratch surface, and the cap was removed from the second flare to expose the flare igniter button. Once again, when the scratch surface lightly struck the igniter button at certain angles, the flare ignited.

It was concluded that, because of the ease of ignition between the scratch surface and the igniter tip, improperly stored Fusees could pose a safety hazard to officers, firemen, and city personnel.

Conclusion

While the fire cause investigation is continuing, the results of Experiment 7 prompted the Tucson Police Department to examine its own human actions and its safety precautions and issue a safety warning regarding flares.

A citywide memo was issued to all employees warning of a possible Experiment 7 scenario. The memo stated: "To minimize the risk of inadvertent flare ignition, which could result in a trunk fire, flares should never be readied or prepared in advance, anticipating need. Igniter and striker caps must remain intact, on the flare, until the flare is needed. Flares should be kept in their original box or placed in a container, preventing migration and minimizing movement." The memo also reinforced the MSDS safety precautions regarding how to store the flares properly.

Research discovered several similar police vehicle trunk fires where flare ignition was determined to be the cause. The following police departments reported similar police vehicle fires: 3 in Burbank, 1 in Alhambra, 3 in Oakland, 2 in Sacramento, and 1 with the Los Angeles County Sheriff's Office. Captain Bob Reinhart, who is a fire investigator with the Burbank Fire Department, investigated several fires in which flares were found to be defective. Due to his investigation, Captain Reinhart, produced an informational video that showed the defective flares and the hazards associated with them.

Other Fire Investigators assisting with the investigation/identification of similar flare problems were Valida Holmes and Mike Dolan of the Oakland Fire Department. We would be interested to know if any other departments have experienced similar squad car trunk fires.

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1. Conkling, John A., Chapter 6: Heat and Delay Compositions, *Chemistry of Pyrotechnics*, pp. 125-128, New York, New York, Marcel Dekker, Inc., 1985.

2. Table 3.3.5 Some Materials Subject to Spontaneous Ignition, NFPA 921 Guide for Fire and Explosion Investigations, pp. 921-17, 2001 edition.

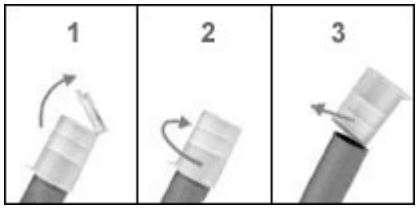
3. Davis, Tenney L., Railway Fusees (Truck Signal Lights), *The Chemistry of Powder and Explosives*, pp. 65-68, San Pedro, California, GSG & Associates Publishers, 1943.

Photo credits: Fig1. *Drawing courtesy of William Condron; Fig 2,3,5 photo courtesy of Tony Windsor.*

Figure 6
An example of a 20 minute flare found in the trunk of an Officer's squad car. This particular one is made by Orion Safety Products. Note the differences between the two manufacturing companies. Photos and instructions courtesy of Orion Safety Products website: www.distress-signals.com

Per Orion Safety Products instructions, these flares are easy to use:

1. *Remove plastic lid to expose scratch surface cap.*
2. *Twist and remove cap, exposing flare igniter button.*
3. *Gently rub scratch surface of cap against black button of flare.*



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California Association of Criminalists

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Mary Graves

1925 – 2003

Friend and Colleague

Mary Graves, a long-time CAC member, died in March of complications from her long battle with cancer.

Mary was born in Flossmoor, Illinois, the daughter of a successful chemical engineer and his wife. She received her bachelors in chemistry from Carleton College in Northfield, Minnesota in 1947. After her marriage, Mary worked as a chemist while her husband completed his studies.

In 1953 they moved to California with their infant daughter and ran a small newspaper in San Jacinto. In 1955 the family moved to Fullerton and quickly expanded to three daughters. Fate steps in here as their first house in Fullerton was down the street from Jack and Evelyn Cadman. The two families became friends, and Mary learned what this "criminalistics" was.

Mary and her husband separated and eventually divorced in 1965. Feeling that she was too far removed from school at this point, Mary went back to prepare herself to be a working single parent. She enrolled in the local community college (Fullerton College) where she received an award as "Woman of Distinction." She went on to Cal State Fullerton where she received a bachelors and a masters in molecular biology.

Remembering her former neighbor and his interesting profession, Mary applied for a position at the Orange County lab and was hired. Her analytical emphasis was in toxicology and forensic serology (who can forget her ground-breaking paper on the incidence of semen on post mortem penile swabs, regardless of cause of death). She later served as a laboratory supervisor in both areas. She retired from the laboratory in 1993.

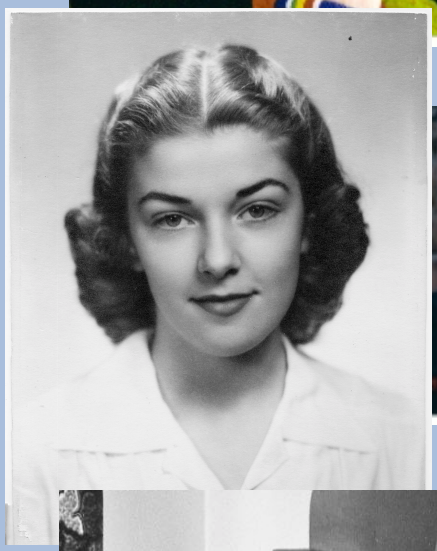
During her time with CAC, she served two terms on the Board as treasurer. She led the Association's infamous battle with the IRS over our tax status, which she (and we) won.

In retirement she was active in many volunteer organizations and pursued her avocations of quilting and bridge. She also traveled extensively, both internationally and to the Bay Area to visit her daughters and grandchildren.

Mary is survived by her sister, Jay, her daughters, Margot, Donna and Helen and four grandchildren, Devin, Cory, Alice and Malcolm.

Mary is greatly missed by all who knew her.

Jim White



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