The CAC News

News of the California Association of Criminalists • 3rd Quarter 2004

The President's Desk

Electrical Leads to Ethical

Recently, I had a local electrician do some work at my house. As he worked, we talked. He asked what I did for a living. I'm sure you have all had the same experience. We are kind of like doctors at a party. As soon as someone finds out what we do, they want our advice or have something to say.

A lengthy conversation ensued, during which no electrical work was done. Thankfully, I was not paying him by the hour. He stated that what worried him most was the fact that anyone in the law enforcement community could plant or manipulate evidence to implicate anyone they chose. We talked about the accusations that the "dream" team put forth in the O.J. trial and about the handful of criminalists (forensic scientists) that have been accused of evidence tampering and giving false testimony. It is unfortunate that a few unethical individuals can overshadow a profession and give people like my electrician friend the idea that this is the norm rather than the exception. I assured him that in my experience these are rare occurrences. "What keeps someone from doing it?" he asked.

My answer to him was that we are ethically and morally obligated to do an unbiased investigation. This includes processing the crime scene, analyzing the evidence and interpreting the findings in court. I told him that in order for an evidence planting "plan" to succeed, a conspiracy of monumental proportions including several individuals would be necessary. I pointed out to him that the logistics of this kind of conspiracy made it an unworkable option.

I also related to him that not all criminalists work for government agencies. There are also many private criminalists. These criminalists review the forensic casework completed by the government laboratory and present their findings as well. We all seek to present the truth regarding the physical evidence whether working in the private or public sector. I'm not sure he left my house totally convinced, but I think I made my point.

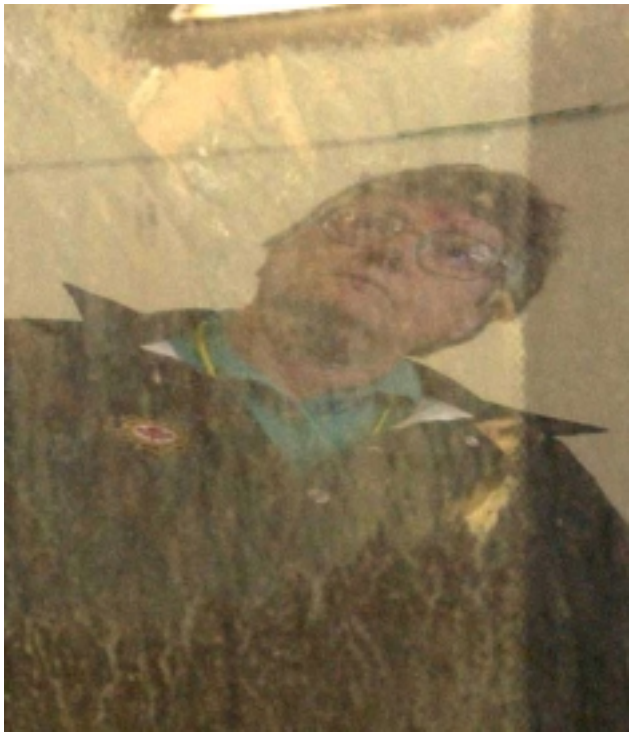
Ethics is such an important part of our profession and it is the cornerstone of the expert witness' credibility. The CAC has one of the most extensive Code of Ethics of any forensic association. If you haven't read it recently, I would suggest that you do so. The language may be a little archaic, but the message is clear. As the last sentence of the Preamble states, "The motives, methods and actions of the criminalist shall at all times be above reproach, in good taste, and consistent with proper moral conduct".

I know I'm preaching to the choir here, but I thought it was worth mentioning.

He asked what I did for a living. I'm sure you have all had the same experience. We are kind of like doctors at a party. As soon as someone finds out what we do, they want our advice or have something to say.

Pennie Laferty
CAC President

Third Quarter 2004



On the cover...
Stephen Mackaig examines the interior of a burned-out Dodge Colt while he presents the Vehicle Arson Workshop at the San Mateo CAC seminar. Above: *John DeHaan is reflected in the smoked window of the same car. More photos inside.*

The CACNews
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New CAC Merchandise Staff Announced

At the most recent meeting of the CAC Board, it was announced that Ashlie Silva, San Diego Sheriff's Dept. Lab, will handle sales for the southern area. She will assist Curtis Smith who will continue to sell CAC merchandise in the northern area. Curtis also said he is offering t-shirts in gray, navy blue, white maroon, forest green and black. For a specific order, he asks members to contact their nearest representative.

Fred Tulleners and Bill Corazza Retire.

With CAC President Raymond Davis acting as master of ceremonies, both Fred Tulleners and Bill Corazza enjoyed simultaneous retirement celebrations. Here are a few photos from the gala event, held at the Dante Club in Sacramento on February 26. Photos courtesy of Faye Springer.

Above: Lou Maucieri congratulates the new retirees; right, Jan Bashinski and Faye Springer each pose with Fred.

Below: Your CAC Borad of directors working hard to maintain the smooth operations of the association!

Calling ALL Quality Professionals
Association of Forensic Quality Assurance Managers

From an online QA discussion list created to be able to share thoughts and ideas with others who shared the same responsibilities and objective, AFQAM was born. As the online membership grew to about 40 participants, and idea formed. After several discussions and dreams, 22 people met in Kansas City to begin the formation of a not-for-profit association. This initial meeting, lasting just several days, poured the foundation to what has quickly become a major influence in forensic labs. From that first meeting in October 2001, an association of professionals formed an alliance with eachother to promote quality assurance, not only in the labs they represent, but in all labs. Well over one hundred people now fill the membership rolls.

The Association of Forensic Quality Assurance Managers promotes standardized practices and professionalism in quality assurance management for the forensic community.

Our vision is to support and enhance quality assurance practices to provide the criminal justice system with the highest quality of laboratory results and services.

As an AFQAM member, you have immediate access to numerous quality assurance professionals in labs spread across this country and Canada. Simply sign on, ask your question and literally within the hour, you may have numerous responses. Our online discussions provide a much needed asset for quality professionals to be able to draw from and to share ideas with quickly. AFQAM members have a library of documents to draw upon. Anything from protocols to Quality Assurance Manuals to training guides can be sent to you from our Resource Committee. The Communication folks produce and publish an amazing newsletter. The general membership meets annually where additional presentations are made. Past presentations from organizations such as NFSTC, ASCLD-LAB, and the FBI just to name a few have proven to be extremely valuable to all who attended.

Membership is open to those individuals who are actively engaged in the field of quality assurance management, or, perform system or laboratory wide quality assurance duties on a regular basis, or, have advanced the profession of forensic quality assurance management in a significant manner.

Applying for membership couldn't be easier. Visit our web-site at www.afqam.org. There you will find a link "How do I Join". You will be able to download the two forms required. The instructions on where to send the forms are printed on the application. If you prefer, you can email our Membership Committee Chair directly at lschultz@indygov.org. He will be happy to assist you.

UPCOMING MEETINGS

2004

Fall: **Ventura Co Sheriff**

2005

Spring: **Oakland PD**

Fall: **Los Angeles PD**

2006

Spring: **Contra Costa Sheriff**

Fall: **DOJ Riverside**

2007

Spring: **Orange Co. Sheriff**

Fall: **DOJ Richmond DNA**

2008

Spring: **Sacramento DA**

Fall: **San Diego PD**

2009

Spring: **Santa Clara Co.**

Senior Forensic Biologist Position

The Southwestern Institute of Forensic Sciences seeks applicants for the position of Senior Forensic Biologist. This position provides daily administrative and technical supervision to a fourteen-member laboratory performing biological evidence screening, serological testing, short tandem repeat DNA testing, and mitochondrial DNA testing. Responsibilities include: planning, assigning and coordinating work assignments; designing and implementing training programs; supervising, evaluating and training staff; participating in the development and administration of the budget; developing and implementing laboratory policies and procedures; participating in quality assurance activities including audits; monitoring work activities to ensure compliance with policies and procedures; reviewing and approving analytical testing reports; acting as a technical resource and providing continuing education for medical examiners, investigators, and attorneys; making recommendations for changes and improvements; preparing and administering grants; acting as a media contact on issues related to forensic science; performing analytical testing; and providing court testimony. This position will act as DNA technical leader / manager and in that capacity will: oversee quality assurance, safety, and training of DNA staff; perform technical problem solving and evaluation of all DNA methods used; and review proficiency testing.

This position also includes a faculty appointment in the Pathology Department of the University of Texas Southwestern Medical Center and related academic responsibilities. The successful applicant must be approved by the University of Texas, Southwestern Medical School.

Minimum qualifications are: a doctorate degree in Biology, Biochemistry, Genetics, Molecular Biology, or a related discipline; ability to satisfy the educational requirements for DNA technical leader position; three years laboratory work experience. Previous experience in laboratory management, and in the preparation and administration of grants is highly desirable. A background check, including a criminal history review, will be performed. The selected applicant must establish residence in Dallas County. Salary range: $4,137-$4,964 / mo.

Further information and online application materials are available at: http: / / www.dallascounty.org.

Deadline for applications: none; applications will be accepted until the position is filled. Timothy J. Sliter, Ph.D., Chief of Physical Evidence, Southwestern Institute of Forensic Sciences, 5230 Medical Center Drive, Dallas, Texas 75235, 214-920-5980, FAX: 214-920-5813, Email: tsliter@dallascounty.org

Let's Head Over to the Crime Lab

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

Okay, maybe this is a moral question but recently heard from Gerard Dutton at the AFTE Meeting in Vancouver, B.C., "Why does it seem the only ones willing to take responsibility for their actions are the terrorists?"

On a side note…

Throughout history the great moral and scientific questions have often times become quite interwoven. As confident as we may be as scientists (and arguably, have to be) we must be aware that there are sufficient limitations on scientific knowledge such that morality cannot evolve from scientific discovery but rather that morality should guide scientific pursuits.

John Jacobson, Chris Coleman, myself, John Murdock, and Bruce Moran...all headed to work at the "Crime Lab!" (Vancouver, BC)

Photo:Jean Nichols

Thinking to a logical conclusion…

Firearms examiners were conspicuously initially left off the recently formed NAS Committee to review and assess the feasibility of a National Ballistics Identification Database, one only recently appointed as a non-voting member. The reason? Apparently they cited a potential conflict of interest. One has to wonder about the private software engineers brought aboard.

Out of nowhere…

I've heard of impairment studies but really, martinis called Cavity Search, Rigor Mortis, and Powder Burns served at the Crime Lab? Yes, it's true—along with three different meal sizes: parking tickets, misdemeanors, and felonies all served at a place called the Crime Lab which resides in the former home of the real Vancouver, B.C. forensics lab.

The ever so necessary Giants update…

I knew if I waited long enough there would be something positive, a recent 10-game winning streak and coming on strong. Another hitter, starter and reliever would be nice but no fire sales happening just yet, so hang tough! At the recent Spring CAC seminar held in Foster City I was asked if I was disappointed that the banquet was at an A's game and not a Giants game. Remember – it's not so much an issue of enjoying the Giants as it is loathing the Dodgers.

Connections…

I was out of town for two weeks and a day spending time in Monterey, Vancouver, B.C., and the inside water passages of Alaska on a cruise. In the meantime, the Giants go on a 10-0 run with the offense, pitching and defense clicking. The options appear clear. Spend more money on players or simply pay Ron and his family to travel all baseball season long? I will be contacting the Giants GM later today.

Advancement throughout the years…

Recently announced were plans to look into the feasibility of incorporating the services of an event planner into CAC seminars. It was felt that having the services of an event planner would bring more continuity between seminars, potentially reduce expenditures for hotels and other related seminar needs, and offer some relief to hosting laboratories hindered by small staffs and ever-increasing caseload burdens. I think that we should extend it even further. Imagine – *C.S.I. Meets the Event Planner*. The ultimate reality forensic show! More details to come…certainly with the way network programming is "advancing" I am certain this one could actually sell in some form or another!

On a more serious, but related note…

Within a span of my two weeks and a day away from my desk the profession of forensic science has witnessed three critical blows. There was the public censuring of an AFTE member for violation of ten sections of the AFTE Code of Ethics, a code incidentally that was modeled after the CAC Code of Eth-

Ron Nichols
CAC Editorial Secretary

ics. More information on this public censuring will soon be found on the AFTE website. Coming to light were the perjury charges regarding testimony provided by the Director of the U.S. Secret Service Forensic Science Laboratory in the Martha Stewart case. Finally, there is what is being referred to as the Madrid Error, a misidentification of latent prints.

Given these, what are we to do? There are several approaches that I would like to discuss, some of which one or more of us have either been a partner to or a witness of. First there is the ostrich method. I am certain we are all familiar with this simple, oft-used, yet highly ineffective technique. Stick our heads in the sand until the storm blows over, pop back up and pretend like nothing ever happened. "Isolated error," we say. "Carelessness," cries another. Many reasons abound for these sand-people—unfortunately, there are as many reasons as there have been errors and issues of ethics within the profession. While distancing one's self from the fray may appear to be the most politically expedient course of action it does absolutely nothing to solve the issues at hand.

Second, there is the town crier method. This is the individual who publicly blasts the responsible parties while at the same time upholding their own laboratory systems as shining examples of why this could never, ever happen to them. "Oust them" as the ancient Israelites would oust a leper from their community. This is the approach taken by any who remain convinced that such incidents are a blemish on the otherwise perfect science of forensics, rather than even contemplating whether they could actually be, at least in part, a product of the current forensic environment. Especially, in a society in which truth has become a relative term.

Third is the "See, I told you" method. This is the handy approach of many who have alternative agendas and are simply seeking an opportunity to voice those agendas. "See, I told you ASLCD/LAB wouldn't work." Of course, they have never stopped to consider that ASCLD/LAB has never made claims of infallibility. While the foregoing is just one example, I am certain that with that example many other individual ones can be conjured up. The one important and common theme is a very loose connection between the incident and the agenda. The fact that the connection gets more credibility than it deserves is a product of the severity of the incident and the mouth size of the antagonist.

Fourth is the baby method. Yes, you guessed it. That is throwing out the baby with the bath water with cries of, "Oh my, this is not working. We have to start ALL over." This is a typical reactionary approach having little usefulness because rarely do they take the time to study the real issues, as the urgency to simply do something is far too great.

On the opposite scale is the research until "death do us part" method, the fifth in this line of approaches. Appoint the committee of scholars to investigate, making sure to appoint no one of any forensic experience because of the all too vital conflict of interest issue. (It is always good to sacrifice knowledge and wisdom to remove any potential tainting by the presence of forensic scientists because, unlike any other profession, they will ALL conspire to protect one another.) Then give them five years to study the issues. Of course, budgeting lasts only for a year but let's not compound the problem. Finally issue the report when the events have long been forgotten just in time to appoint a new committee to investigate ways to implement the myriad of suggestions from the first committee with no budget to do so.

Finally, there is the stand up and take responsibility method. Certainly not the tastiest approach because we are all subject to swallowing something of which we may not enjoy the taste, but it will be the most effective approach. This method has several elements all of which are equally important to its success.

First is the individual element. There will be no success unless the individual is willing to stand up and at least admit the potential that he or she could have made a mistake. Of course, if one is not willing to even entertain that notion then admitting to the fact that one did make a mistake is definitely out of the question. I found myself in a discussion of ethics with an individual who clearly believed that those who made wrong choices were not actually responsible for the choices that they made because maybe it was, "…the only way they knew. Therefore, for them it was not wrong." I beg to differ. Even though the right approach (es) may not be known does not give one the right to move forward with inappropriate choices. There is always an individual element in these issues and it is up to the individual to accept responsibility for his or her role in the event.

Second is the corporate element. This element is defined by the individual's immediate environment. Yes, the laboratory has a responsibility as well. Mediocre laboratory management will try to isolate the event from the laboratory. Good laboratory leadership will take responsibility for their role in the event, investigate and take the necessary steps not only to deal with the issue but also to re-establish a level of public trust. For issues of mistakes and ethical violations, there is always a corporate element in some respect. It may be slight, but it does exist.

Third is the professional element. This element is defined by the entirety of the profession. We have a responsibility to acknowledge that despite our best efforts, mistakes and ethical violations can and do occur. We have a responsibility to investigate why they occur. Without completely alienating the choices of the individual from the equation, we need to investigate the event and those incidents that led up to the event and be prepared to make the necessary changes to help alleviate the potential for later occurrence. In order to do this we need to make sure that we are addressing the cause and not the symptoms. Ironically, considering that we constitute a profession that deals daily with cause-and-effect investigation, we are ill prepared to handle these issues.

We have all (and I certainly include myself in that group of all) made incorrect and inappropriate choices in our lives whether they are associated with work or not. It is vital that as individuals we stand up and take responsibility for those choices. But, it does not end there. The profession also has a responsibility and it is important to step up to the plate, be introspective and develop a course of action that is a response and not reactionary. The biggest foes are arrogance and pride. Sadly, as a profession we are good at breeding both. But, I guess that is for another time.

Until next time…

That last statement may be a foretaste of what is to come. Of course, I am never quite sure until I actually sit down at the keyboard. Until then, my best wishes for you and your families.

REPORT: CAC Southern Section Activities:

The Naval Criminal Investigative Services Lab in San Diego hosted the Spring 2004 luncheon meeting. The meeting was held on March 30 at the 94th Aero Squadron and Bob Blackledge was the coordinator. 47 people showed up for the lunch. The lunch speaker was a forensic nurse consultant who discussed and illustrated with case examples the expanding role of forensic nursing and the need for liaison with investigators, criminalists, doctors, and attorneys.

Four study groups met: Trace, DNA, Arson, and Drugs.

Trace Study Group: a new security glass has been developed which allows a bullet to pass through from one side, but not the other; a summary of forensically relevant presentations from Pittcon and AAFS, was discussed.

Forensic Biology: they had a guest speaker, Defense Attorney Christopher Plourd, who talked about post-conviction DNA testing.

Arson: Eric Wahoske is replacing Collin Yamauchi as the chair of the Arson Study Group. Analytical methods for fuses were discussed as well as performance standards with GCMS analytical equipment; guidelines for the preparation and distribution of proficiency tests; grant funding through SBIG (small business initiative grant); differences between evaporation and burning of ignitable liquids.

Drugs had a presentation from Nathan Salazar, from NCIS San Diego on the analysis of the tryptamine analogs. There was open discussion about SWGDRUG, statistical analysis numbers, and if anyone had seen GHV or GVL in their impounds.

While Quality Assurance did not meet at the luncheon meeting, the QA group conducted a QA system audit for the San Diego Police Department on April 7th. A quality system audit is planned for Riverside DOJ in June.

Long Beach has graciously agreed to host the next luncheon meeting in July with an opportunity to show off their new lab and newly accredited facilities.

John Simms
CAC Regional Director, South

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*.

Lost and Found

The obituary of David Burd [*The CACNews*, 2nd Quarter, 2004] ended rather abruptly. Here is the missing text as is should have appeared.

"The part I find remarkable is that diabetes never slowed my father down," Long said. "It didn't hold him back.

"He imparted in me the desire to travel and experience nature everywhere, whether it's in the back yard or a foreign country," she said.

Mr. Burd was preceded in death in 1980 by his wife, Virginia. Washburn became his partner—and traveling companion—23 years ago.

—Ed.

Open Letter to ASCLD/LAB Board of Directors

I assume that ASCLD/LAB will be convening some type of investigation or review of the circumstances in the FBI laboratory that resulted in the misidentification of the fingerprint in the Spain train bombing case. I also hope that there will be no delay in announcing that such an investigation is underway.

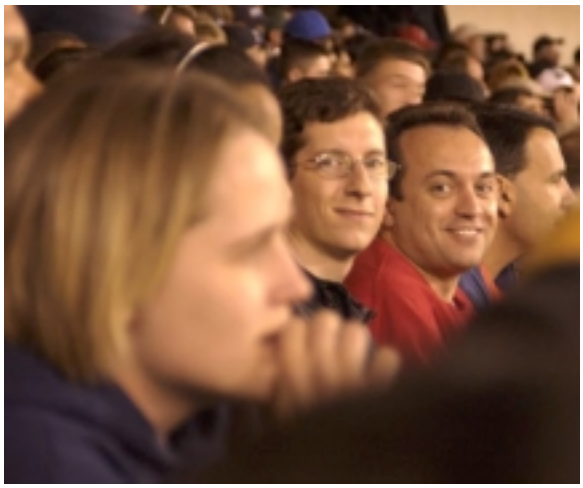
It is self evident that this situation will have long lasting and devastating effects on the entire practice of forensic science. I believe it is imperative the ASLCD/LAB address this issue without delay, publicly identify what went wrong, and what steps both the FBI laboratory and the ASCLD/LAB accreditation process will take to make sure this situation does not happen again. Otherwise, how can any laboratory, or ASCLD/LAB, claim that accreditation provides any assurance that laboratory results are reliable?

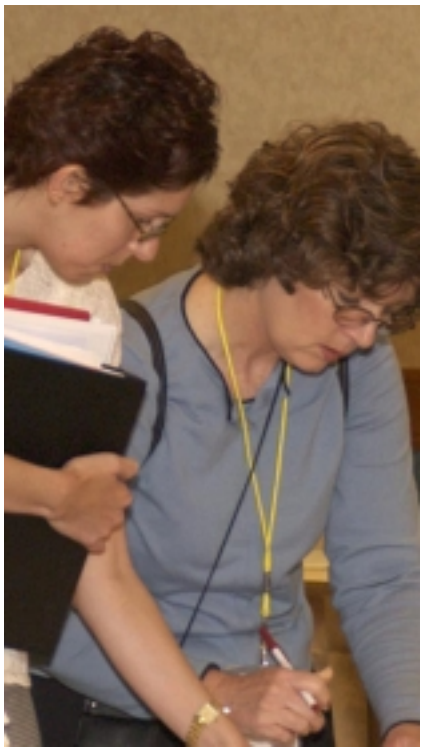
Given the egregiousness of the error, apparently replicated by 3 or 4 FBI examiners, I would hope that ASCLD/LAB would suspend the FBI laboratory's accreditation pending the outcome of, at a minimum, an initial investigation. Laboratories endeavoring to do competent work, whether they are accredited or not, will be undermined by delays and resistance to review that one would not be surprised to see.

ASCLD/LAB has accepted the responsibility of defining and monitoring what constitutes acceptable forensic laboratory practice in the US — and beyond. It is now time for you to step up to the plate and demonstrate to the forensic laboratory community, the users of forensic laboratory services, and the general public that ASCLD/LAB takes its role seriously and is prepared to take quick and decisive action when circumstances warrant.

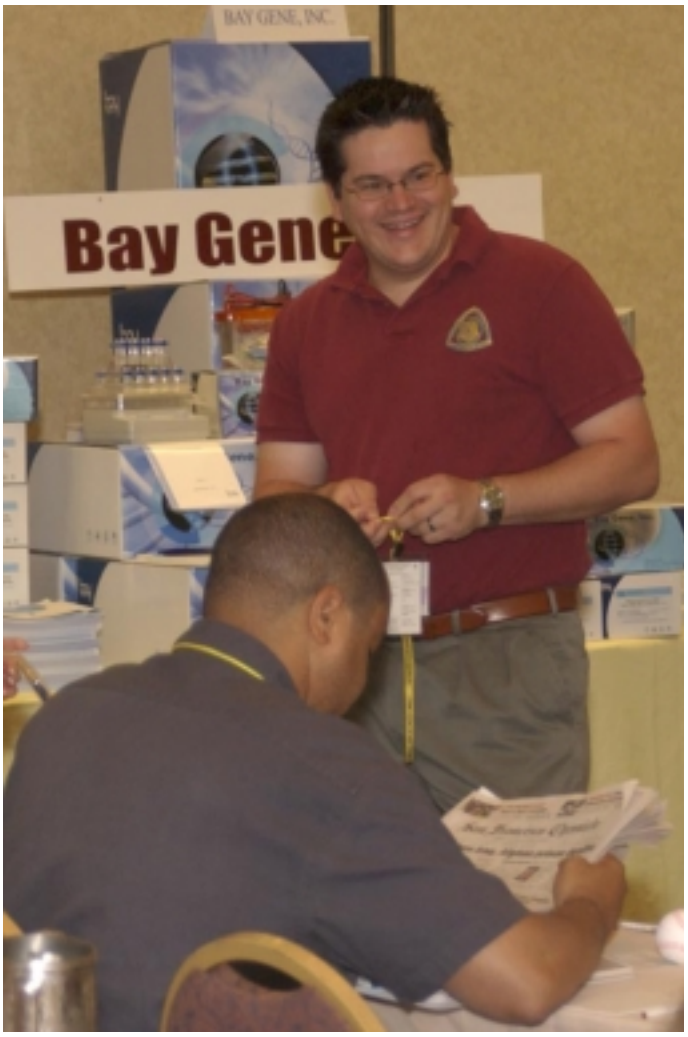
—Peter Barnett
Forensic Science Associates
Richmond CA

Spring was sprung in San Mateo as the 103rd semiannual CAC seminar got underway. Hosted by the San Mateo County Sheriff's Laboratory, the seminar opened with several workshops including Vehicle Arsons, taught by Stephen Mackaig (*facing, right*). Papers and presentations were made during the week, summarized in this issue (see *Seminar Abstracts*). The event culminated in an exciting trip by prisoner bus across the bay to Oakland where somehow Mona Ten was even able to arrange for the Oakland A's to win and send those Yankee's packing! How'd you manage that, Mona!






California Association of Criminalists
COLUMBUS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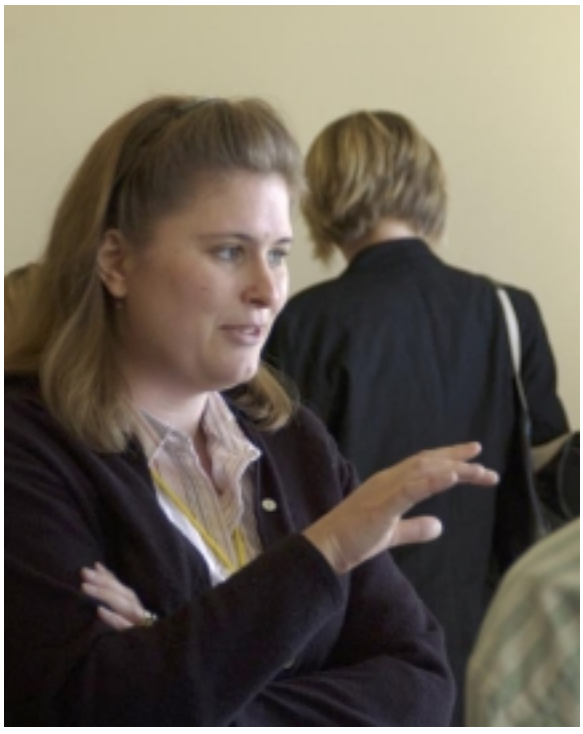

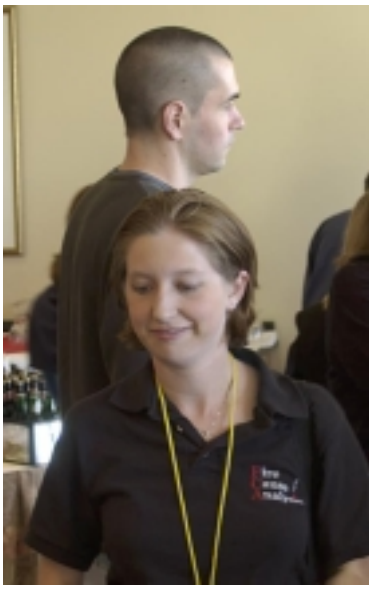


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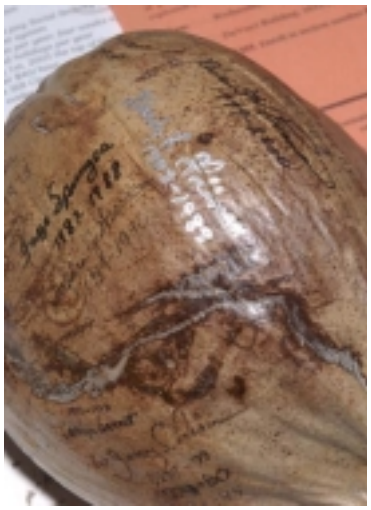
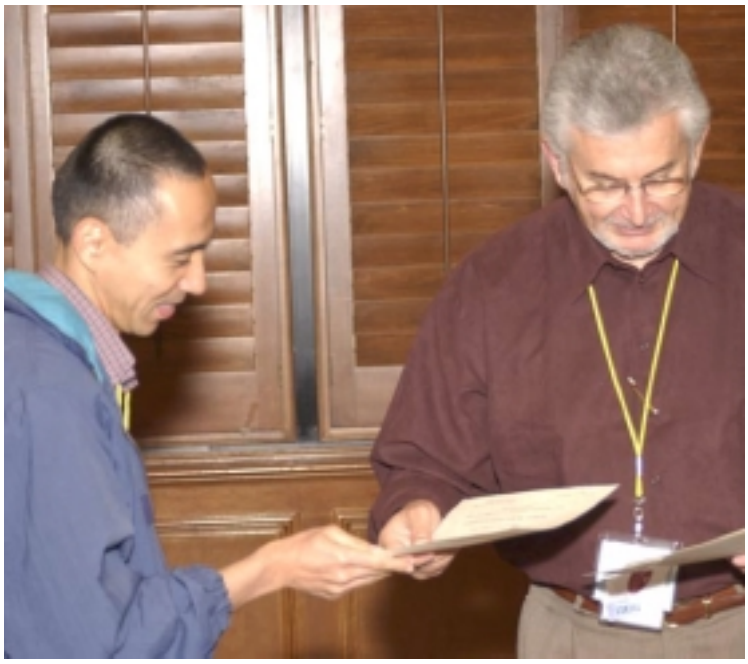


The awards are awarded, and the traditional CAC coconut is passed from outgoing President Raymond Davis to incoming President Pennie Laferty.

That's all from San Mateo—See you in Ventura!



Exploding Gas Cans and Other Fire Myths

John D. DeHaan, Ph.D., FABC, CFI

Introduction

There are a number of myths and misconceptions held by members of the public and, unfortunately, some investigators, that can seriously derail the search for an accurate judicial decision. This presentation will explore a few of these myths and offer experimental proof (or disproof) and the relevant scientific rationale.

Myth 1: Gasoline cans or vehicle gas tanks explode when exposed to any flame, engulfing the unfortunate bystander.

Photo 01 - ignition

It is often suggested that vapors emanating from a fuel tank or gas container sustained ignition within and exploded in a massive, engulfing fireball. An examination of the basic physical processes involved shows that the vapor pressure and temperature of the fuel and the flammability range of that fuel will determine the ignitability of vapors in the container. Once the fuel involved is identified, the vapor pressure curve of that fuel can be calculated or found in spreadsheet data. The temperature to which the fuel is exposed can be estimated from the scene investigation. As the curve in Figure 1 shows, at any normal temperature (between –20 and 40°C), the saturation vapor pressure of pentane (the major component in fresh automotive gasoline) is well above its upper flammability limit (UFL) (denoted by the long dashed line in Figure 1) at 8% - 61 mmHg. Similarly, at any temperature above ~0°C, hexane, the main ingredient in Coleman© type camping fuels, will be above its UFL and therefore not ignitable in a closed container where the vapors have formed an equilibrium concentration. Firefighters know that vehicle tanks rarely explode in a fire but will support a plume of flame around the filler cap, overflow vent, or wherever vapors can escape and mix with surrounding air to be diluted into their flammability range.

Presented at the Spring CAC Seminar, May 2004, San Mateo, CA.

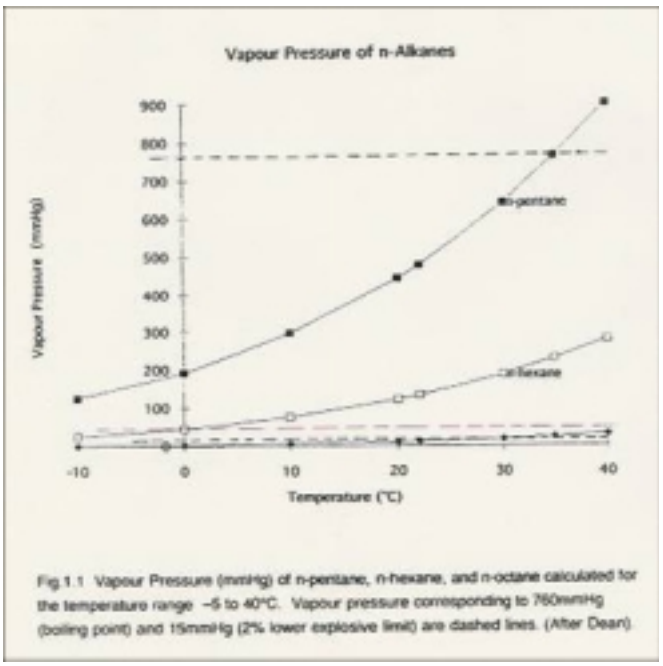


Fig.1.1 Vapour Pressure (mmHg) of n-pentane, n-hexane, and n-octane calculated for the temperature range –5 to 40°C. Vapour pressure corresponding to 760mmHg (boiling point) and 15mmHg (2% lower explosive limit) are dashed lines. (After Dean)

Fig. 1 Long dashed line is upper explosive limit (8% 61 mmHg) for alkanes

To test the theoretical (calculated) concept, empirical testing of plastic fuel containers filled with gasoline was conducted in cooperation with the New Zealand Police Service. A 20 liter HDPE container full of gasoline was rocked about with a loose cap so that gasoline spilled from the front and pooled around the cap. On ignition the spilled gasoline on the side of the can burned off in seconds, not even scorching the label (Figure 2). The pool around the cap burned for some seconds, igniting the plume of vapors coming from the loose cap. This fire was a small clear flame about 5" (12 cm) high, as in Figure 3. The plastic cap eventually melted into the container (with burning, molten droplets of plastic falling into the gasoline below). As the opening increased in area, and heat was absorbed by the gasoline, the plume got larger, but there was no propagation into the can to cause an explosion. In these tests eventually the entire top of the can melted or burned away, exposing the entire horizontal surface of the gasoline (see Figure 4).

Fig. 2 After 1 minute, the spilled gasoline on the front of the HDPE container has burned off, and a small pool fire is burning in the recess around the cap

Fig. 3 At 10min, the cap is melting and burning droplets of melted plastic are falling into the gasoline – sizzzzz. Experimenter is clearly worried about massive deflagration!

Fig. 4 After 21min, the top has melted, the gasoline expands and flows over the edge to produce a large spill fire.

The maximum size of the fire is controlled by the area of the pool exposed multiplied by an experimentally determined kW / area factor. For gasoline, that is around 1800 – 2000 kW / m^2. For a typical 20 liter (5 gal.) container 15" x 15" in size, this means a maximum fire of about 400 kW. Estimates of the HRR of these tests based on plume height reveal a maximum fire of ~150 kW (seen in Figure 4), the reduction being due to the "lip" of plastic around the pool, reducing entrainment efficiency. Even when the test was conducted with a "flat style," 10 liter container half full lying on its side with no cap, there was no explosion. In that test the upper side of the reclining can melted away over a period of minutes (Figures 5-9). Eventually the plastic containers fail as the gasoline overflows from expansion, and a very large pool fire results, but there is no explosion.[1]

Fig. 5 OK, let's try a more extreme test. A half-full can lying on its side with the cap off, gasoline to the lower edge of the filler

Fig. 6 One Minute – nice quiet little flame at mouth of filler, but no explosion

Fig. 7 Five minutes after ignition – filler neck is melting, flame is slightly larger, but no explosion

Fig. 8 10 minutes – the top of the can is melting and the flame is getting larger as the vent increases

Fig. 9 Finally, after 14 minutes, the top (side) of the can has melted and there is now a pool fire

Myth 2: Gasoline vapors are readily ignited by a cigarette.

This is an enduring myth, once again because of television and movie images of heroes (or villains) igniting gasoline with a tossed cigarette. When repeatedly field tested by the author using ordinary tobacco cigarettes, puffed, thrown, dropped or placed on, above or in a pool of gasoline, there has never been an ignition. At first glance, it seems obvious there should be an ignition – a fuel vapor in ignitable concentration, a fuel with an autoignition temperature of 280 - 456°C (536 - 850°F) (depending on grade), and a source with an observable glow meaning temperatures above 500°C. Robin Holleyhead, in his excellent review of the problem, revealed several critical factors.[2] X-ray thermography revealed very high temperatures (775°C) in the center of the coal, especially when being puffed. These temperatures, however, are very localized and drop off to 300 - 500°C at the margins (as in Figure 10). The poor thermal conductivity of the layer of ash that develops on the charring tobacco minimizes transfer of that heat, so the "effective temperature" of the surface in contact with the gasoline vapors is even lower.

The oxygen content of the air stream in the burning cigarette is also very low (< 2% in the "coal" region), also shown in Figure 10. The air flow, shown in Figures 11-12, also directs the inhaled gasoline around the coal. The velocity of gases moving through the tobacco during puffing can be as high as 4 m/s. This results in a residence time of less than 1 ms between the gasoline molecules and the heat surface. This is far below the 10 – 20 ms needed for ignition of gasoline vapors. Gasoline vapors have a minimum ignition energy (MIE) of ~25 mJ, meaning that that amount of energy has to be transferred from a source to the fuel for ignition to occur. Contact time of 1 ms is insufficient.

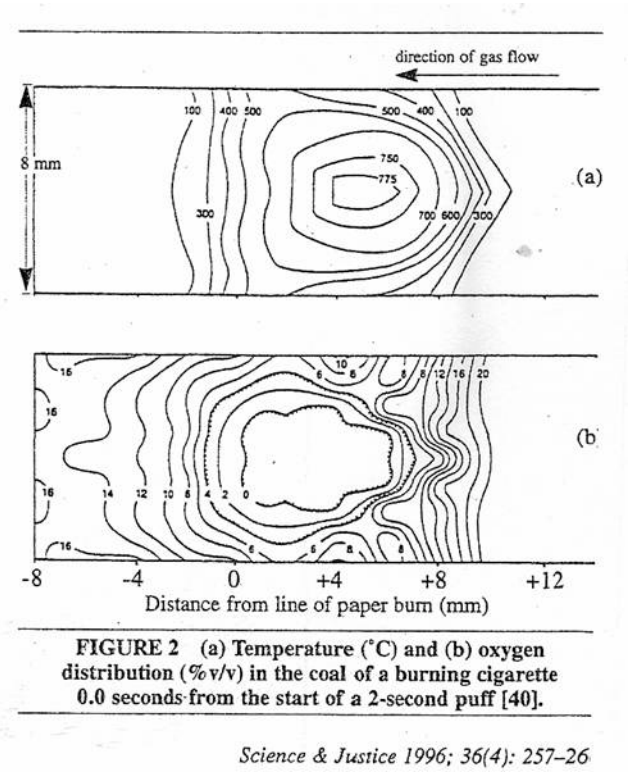


Fig. 10 From Holleyhead, 1996

Finally, for a plume to propagate, there has to be a minimum clearance between surrounding barriers (quenching distance). For gasoline vapors, the quenching distance for a poor thermal conductor like wood or tobacco is on the order of 2 mm. Typical packing densities of commercially-made tobacco ciga-

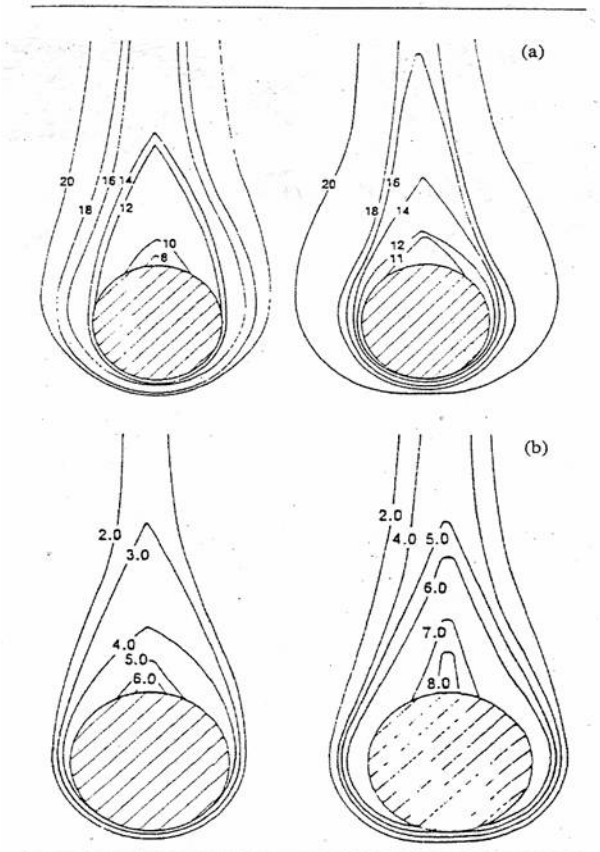


FIGURE 4 Distribution (% v/v) of gases around the coal, +3 mm from the paper burn line. (a) Oxygen at 0 seconds (left) and 1.0 second (right) from the start of the puff; (b) carbon dioxide, at 2.0 s (left) and 2.5 s (right) from the start of a puff [41].

Fig. 11 From Holleyhead, 1996

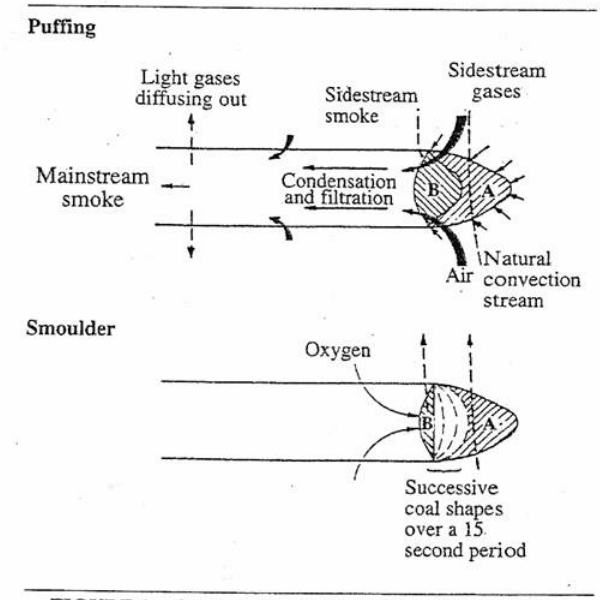


FIGURE 1 Combustion of a cigarette during smoking. A: Combustion zone. B: Pyrolysis and distillation zone [9].

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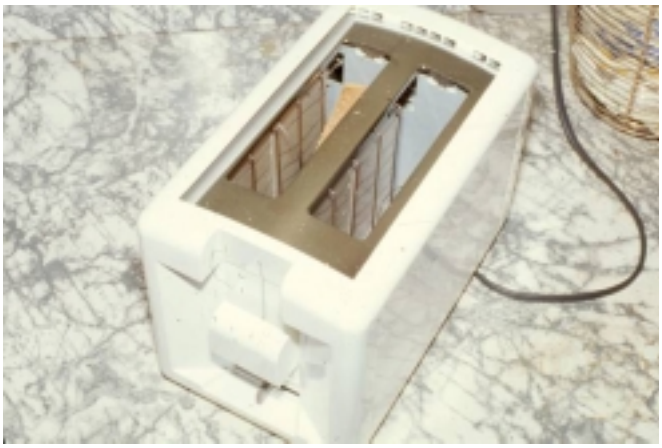
Fig. 12 From Holleyhead, 1996

rette are such that spacing between adjacent tobacco strands is too close to allow a flame to propagate.

Therefore, for a variety of reasons, a glowing, commercially-made tobacco cigarette is incapable of ignition of methane, LPG or gasoline vapors (*unless* it can be prompted to produce a brief flame by oxygen enrichment or contamination in the paper). However, the minimum ignition energies and quenching distances of some other, more reactive, fuels, such as acetylene, hydrogen or carbon disulfide, are *much* lower than those of methane or low M.W. alkanes. Therefore, cigarettes can, and do, ignite hydrogen and acetylene gases or CS_2 vapors. The identity of the fuel actually present is, therefore, a critical piece of the puzzle.

Hot surface ignition (as opposed to open flame or electric arc) plays a role in cigarette ignition as well as in a related myth, that any ignition source with a surface temperature greater than the listed AIT for a fuel will be capable of ignition of that fuel. We can refer to this as Myth 2A.

Myth 2A: Any ignition source with a surface temperature above the AIT for gasoline vapor will be competent.



As pointed out previously, the published autoignition temperature of gasoline is 280°C (536°F). (It should be noted that this value is for 80 Octane motor fuel. AIT is highly dependent on the grade: 100 Octane motor fuel has an AIT of 456°C (850°F).)[3] So simply dripping gasoline onto a hot surface such as a radiant heater or Calrod stove element will not result in ignition (Figure 13).

AIT is usually determined by ASTM E659 in which 100 ml of the fuel is injected into a glass flask at a predetermined temperature and given up to 30 s to ignite.[4] If there is no ignition, the temperature is raised until there is (nearly) immediate ignition upon injection. Several factors are involved – heat transfer from a large heated surface and the full enclosure of the vapors such that they cannot migrate (by buoyancy) away from the heated surface. When gasoline is dripped onto a hot surface, it evaporates *very* quickly, cooling a localized area of the hot surface, with minimal contact – or residence time. As the liquid vaporizes, it rises away from the heat source. By the time it is in an ignitable concentration, it is no longer in contact with the heat source. The American Petroleum Institute reported that a flat, open, heated, metal surface had to be at least 200°C (360°F) hotter than the listed AIT of the fuel before there was reliable ignition of low viscosity hydrocarbon fuels.[5] (High viscosity fuels such as kerosene, diesel fuel, motor oil or auto transmis-

Fig. 13 Hot surfaces have to be glowing orange (>900ºC) to be a reliable ignition source for automotive gasoline in open air

sion fluid have lower AITs and longer contact times than gasoline, and therefore present a higher ignition risk.)

Myth 3: Gasoline vapors mix readily with air and form a widely-dispersed ignitable vapor/air mixture.

An ignition source anywhere in a room with a flammable gas or vapor is competent. Will a faulty light switch (arcing as it is operated) ignite gasoline vapors? Will a pilot flame on a gas water heater ignite natural gas as soon as it leaks into the room? To challenge this myth, four factors have to be considered:

1. **What is the vapor density of the gas or vapor involved?**
2. **Are the circumstances of its release likely to produce a well-mixed fuel/air mixture or a stratified one?**
3. **Where is the ignition source compared to the fuel source?**
4. **How much gas or vapor is introduced and how quickly (to overcome leakage to reach any ignitable concentration)?**

We have to remember that we do not need to fill the entire room with a fuel to its lower flammable limit for there to be

Fig. 14 Gasoline deflagration in wood frame structure (photo by DeHaan)

ignition or even an explosion. All that is needed is to produce an ignitable concentration somewhere in the room and have a competent ignition source *in contact with it*. Depending on the fuel, the stratification can be very marked. This author has had a lighted 6" tall candle fail to ignite the lake of gasoline in which the candle was standing (because the vapors were 2.5 – 3 times the density of air and were escaping by advective flow (gravity-driven horizontal flow) along the floor faster than they could diffuse upward). It was not until the candle was physically knocked over that ignition was achieved.

Myth 4: A heavier-than-air vapor mixture will push out the bottoms of walls of a confining structure when deflagrating, while a lighter-than-air mixture will push out the tops of the walls.

When a stratified fuel/air mixture is ignited, the distribution of blast damage will reveal whether the pre-blast fuel vapor was lighter or heavier than air.

Blast damage to the lower portion of a wall, such as Figure 14, was once considered proof that a heavier-than-air fuel was present. This made a certain amount of "common sense" since one would expect the most energy to be delivered in the proximity of the most fuel. Engineers pointed out that the pressure produced by a deflagration (subsonic propagation) inside a room equilibrates at the speed of sound; therefore, the pressures would be uniformly distributed (in a normally-proportioned room) at very nearly the same time.

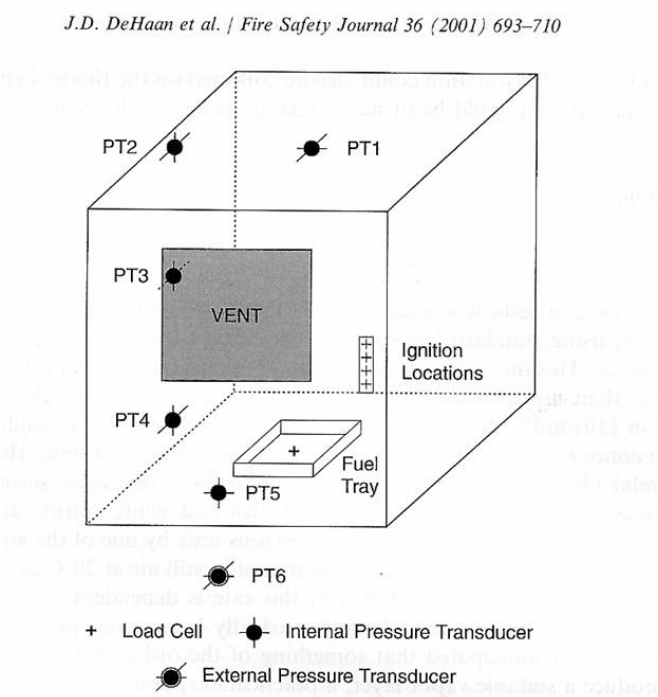


Fig. 15 Diagram of explosion chamber

A hypothesis to be tested then is: if a stratified layer of heavier-than-air fuel vapor is ignited in a compartment with pressure transducers mounted in various locations, we should be able to detect any difference in pressure created or time of impact.

To test both Myth #3 and Myth #4, the 20 m^3 explosion chamber at FRS-Cardington was used for a series of experiments.[6] Hexane was allowed to evaporate into still air from a floor-level tray (Figure 15). A load cell beneath the tray allowed the monitoring of the quantity of hexane evaporated as a function of time. Pressure transducers on the floor, ceiling, and at three heights on one wall recorded the overpressures produced upon ignition. Data from the transducers would allow evaluation of pressures (magnitude and time) to test myth 4. Pressure would be limited by the failure strength of a 1 m^2 fiberboard panel in the front of the chamber. A video recorder outside the compartment monitored flame propagation inside and outside the pressure relief panel.

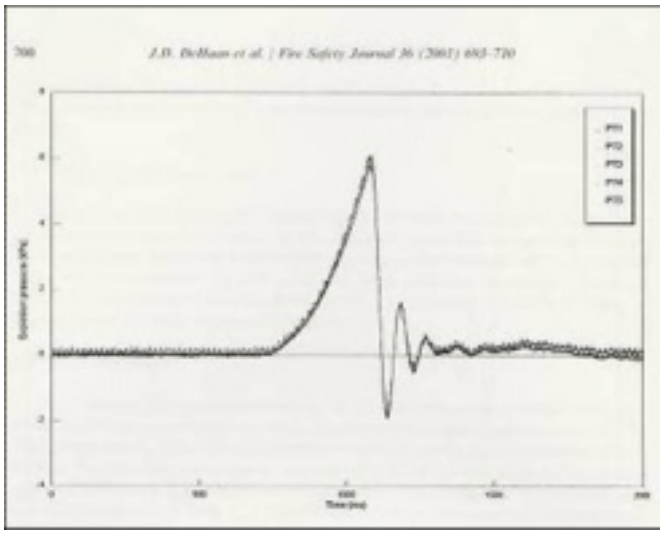


Fig. 16A Pressure signals from five transducers after ignition of 133 g hexane

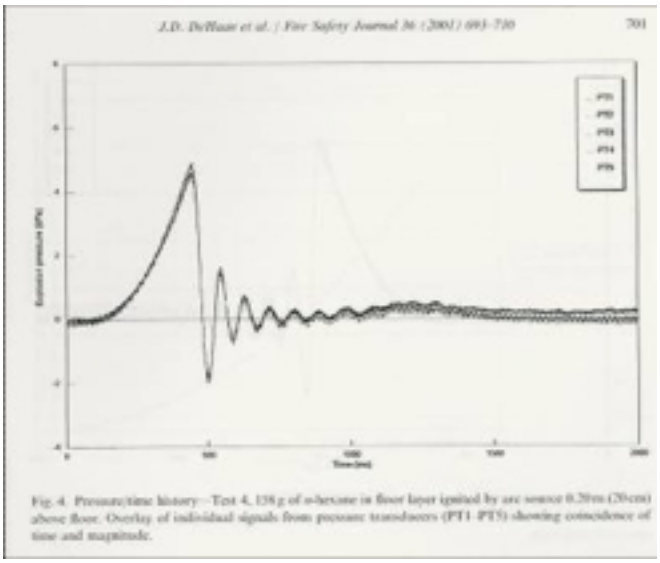


Fig. 16B Pressure signals from five transducers after ignition of 155 g hexane

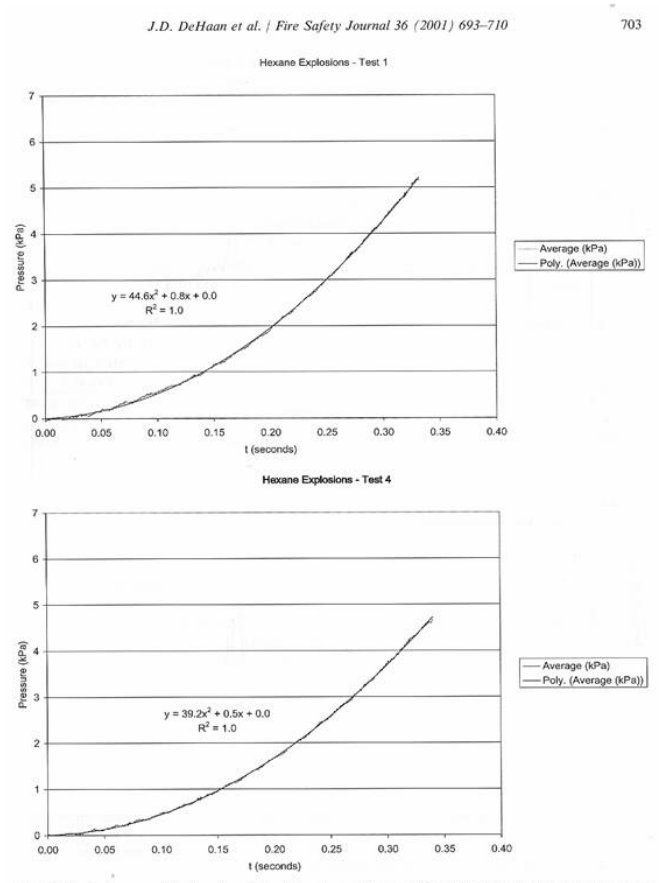


Fig. 6. Typical pressure (P_{av}) vs. time plots with polynomial curves fitted Top: Test 1: shallow hexane layer (ignition at 0.05 m). Bottom: Test 4: deeper hexane layer (ignition at 0.2 m).

Fig. 17 Pressure v time for hexane deflagrations demonstrating t-squared dependence

To test Myth #3, the ignition sources on the back wall were electric arc (spark plug) sources spaced at 5, 20, 35, and 50 cm from the floor. They were manually sequenced from top down for each test. Hexane has a vapor density of 3.0, very similar to that of gasoline (2.5 – 3.5), so it will form a discrete stable layer at floor level in still air. The mass loss data (from load cell) was used to calculate the volume and depth of that discrete layer.

With 14 min. of evaporation time (at 20°C) ~133 g of hexane (MW 86) had evaporated. Calculated vapor volumes indicated that this was enough to produce some 35 liters of vapor at floor level. The sequenced ignition sources produced ignition only when the source at 5 cm was triggered (not at 50, 35 or 20 cm). With 20 min. of evaporation ~155 g of hexane had evaporated, so the layer was expected to be somewhat deeper. Ignition was achieved at 20 cm but not at 50 or 35 cm. This proved that, with a stratified vapor layer, ignition can only occur when the source was in the layer.

The pressure curves in Figure 16 showed the pressure signals from all five transducers in the room overlaid. All five showed the same development curve, peak pressure magnitude (approximately 0.7 psi) and coincidence in time (± 5 ms). The same magnitude was observed with the larger quantity of fuel (155 g) as with less (133 g), so the magnitude of explosive effect is not *necessarily* determined by the quantity of fuel. (More fuel does not necessarily mean a bigger bang!)

The data in Figure 17 show that pressure development in a deflagration under these conditions follows a t^2 curve with a development time of ~300 – 500ms (shorter times with more turbulent propagation).

In a deflagrating explosion, with all pressures equal, the compartment (or structure) will fail first where it is weakest, no matter how the fuel is distributed prior to ignition. Thermal damage (scorching) or soot deposits, however, will tend to reveal where an over-rich fuel layer was located. This is due to post-blast burning and incomplete (fuel-rich) combustion occurring there. The house in Figure 18 was seriously damaged by a natural gas explosion. There was essentially no fire damage to the main living areas. The *underside* of the main floor deck (basement ceiling) was very badly burned (Figure 19) and there was a soot line about 5' above the basement floor. The natural gas leaking into the basement had accumulated to a very fuel-rich mixture in the joint spaces of the floor deck. The explosion was triggered when movement of the occupant stirred the gas layer into contact with the water heater burner. The explosion lifted the entire house and dropped it back onto its foundation, shaking the roof loose in the process.

Mechanical ventilation (fans and HVAC systems), open doors or windows, or movement of vehicles or occupants can stir and mix layered fuel air mixtures and bring them into contact with ignition sources. Solar heating of a room can produce thermal circulation of light fuels such as propane. Environmental conditions and human factors are important.

Fig. 18 Wood frame house after natural gas explosion in basement (courtesy of Steven Shanks, Bolingbrook, IL FD)

Fig. 19 View of basement of house in Fig. 18 showing thermal damage and charring of wood joists caused by post-blast burning of excess gas (courtesy of Steven Shanks, Bolingbrook, IL FD)

Conclusion:

It is easy to fall for "I saw it in the movie, therefore it must happen" logic. It can happen to judges, jurors and lawyers. Even experienced fire investigators may believe in these myths. It is up to us as scientists to test the hypotheses and gather the data to prove or disprove the bases for investigative conclusions. Unless the criminalist is prepared to counter these myths in an investigation, he or she may be ignored in the face of the "common knowledge" about fuels, fires and explosions.

Footnotes:

1. New Zealand Police Service, unpublished tests, March 2002.
2. Holleyhead, R., "Ignition of Flammable Gases and Liquids by Cigarettes: A Review", *Science & Justice*, 35, 4, 1996, 257-266.
3. DeHaan, J. D., Kirks Fire Investigation, 5th Ed., p. 61.
4. ASTM E659 – Standard Test Method for Autoignition Temperature of Liquid Chemicals, ASTM, W. Conshohocken, PA.
5. API Publication 2216, 2nd Ed., Jan. 1991.
6. DeHaan, et al., "Deflagrations Involving Stratified Heavier-Than-Air Vapor / Air Mixtures", *Fire Safety Journal*, 35, 2001, 693-710.

ABSTRACTS

FROM THE

SPRING 2004 CAC SEMINAR SAN MATEO

Seasonal Distribution and Abundance of Forensically Important Flies Within Santa Clara County

Adrienne Brundage, Graduate Student, San Jose State University, 1250 A Edgewood Rd, Redwood City, CA 94062, 650-839-0238, email adie@deanandadie.net; Jeffrey Y Honda, P.h.D., 1898 Harmil Way, San Jose, CA 95125, 408-269-4309, email: jhonda@emai1.sjsu.edu

Forensic entomology has become relatively common in criminal investigations. As insects become more common as indicators of post mortem interval, gaps in information at the local level become apparent. While flies as forensic indicators are well studied, they exhibit great variation in both successional patterns and seasonal abundance due to microclimates. It is this variation that causes the forensic entomologist the most difficulty. The entomologist must adapt data from studies that have taken place miles away or create new, tailored studies to gather data specific to the current case. While the second option is ideal, time and monetary constraints can make it impossible, leaving the scientist to glean what general information is available in the literature. This does yield acceptable post mortem interval estimation, but accuracy suffers. These issues were brought to the forefront in the Bay Area by two cases in which general data had to be used due to a lack of local studies. The existence of these cases led to a two year study of seasonal distribution and abundance of forensically important flies in Santa Clara County.

Three areas within the county were identified as common dump sites: urban areas, mountains, and rivers or streams. Four traps baited with liver were placed in each of these areas and checked for flies once a week for two years beginning in 2001. The insects collected were then pinned and stored for identification. The resulting collection consists of over 16,000 flies, and is therefore still in the identification stage. This presentation includes a summary of the two cases that led to the study, as well as the preliminary findings of the project.

Author, *Stiff: The Curious Lives Of Human Cadavers*

Mary Roach, 26 Fell St., San Francisco, CA 94102, roach@sfgrotto.org, 415-487-1950.

I'll be talking about the experience of writing *Stiff*, and about the mysterious world of book publishing and its insatiable appetite for dead body books. I'll talk about the trials and tribulations of being an outsider trying to gain entry into the realm of the research cadaver, and about what I found there. I'll cover the usefulness of research cadavers in furthering forensics techniques—cadavers as helping solve mysteries, as opposed to being the mysteries that need to be solved. Questions and discussion encouraged. Feel free to interrupt me!

"There is More Than Meets the Eye"—Fraud Investigation

Dinah P. Shaw, Fraud Investigator Citigroup Investigative Services aka Citibank, 704 Haight Ave., Alameda, CA 94501, dinah.shaw@citigroup.com, 510-337-0674

Tips on what to look for in a search, especially as it relates to electronic/computer crimes.

A New Forensic Arena (Forensic Locksmithing)

Herbert T. Miller, Sr., CFEI, CFL, CPII, CEP, CFV, Vinlocksmiths, PO Box 40566, Indianapolis, IN 46240, (317) 337-0846, Hmiller@vinlocksmiths.com

To determine if mechanical locks have been rotated and opened using anything other than a key that has been provided for that lock.

Objective: Commonly used in all types of vehicle and structure theft situations involving any type of possible entry that is superstitious and covert.

Relevance: Careful dismantling of the component, with a microscopic examination of all relevant parts.

Results: The determination if the lock was ever rotated with anything other than the designed key.

Conclusions: Forensic locksmithing is an investigative process that can be used on various types of crimes where entry into a vehicle or structure or any type of lock device if necessary.

Casework Application of Y-Plex 12, A Y-chromosome STR Typing System

Jaiprakash B. Shewale, Sudhir K. Sinha, Huma Nasir, Gina Pineda and Jaiprakash G. Shewale, ReliaGene Technologies, Inc., 5525 Mounes St., Suite 101, New Orleans, LA 70123, (504) 734-9700, Jaiprakash@reliagene.com*

Y-Chromosome Short Tandem Repeats (Y-STRs) have become popular in forensic DNA analysis because of the ability to obtain a male profile from an evidence sample containing mixture of male and female DNA. In addition, the haplotype nature of Y-STRs enables to identify number of male contributors. Further, differential extraction is not required; yet another advantage of Y-STRs.

The Y-STR typing system. Y-PLEX 12, enables simultaneous amplification and analysis for 11 Y-STR loci recommended by the Scientific Working Group on DNA Analysis Methods (SWGDAM) namely DYS19, DYS385a/b, DYS3891, DYS38911, DYS39O, DYS391, DYS392, DYS393, DYS438 and DYS439 for forensic analysis. In addition the Y-PLEX 12 system comprises sex determinant locus Amelogenin as an internal control for PCR. Y-PLEX 12 is being used routinely in forensic casework. Several difficult cases have been resolved. Among the evidence and reference samples analyzed, the success rate was 43% and 19% in obtaining complete and partial profiles, respectively. It is possible to obtain a male profile from difficult samples such as azoospermic semen, no sperm fraction ('E' fraction), bite marks, and dried secretion swabs. The study reveals that Amelogenin is a very useful internal control and provides critical evaluation of the extent of amplification of mixture samples containing human male and female DNA. Several forensic casework examples demonstrating the utility of Y-STRs will be presented.

The Zodiac Case: Where it Stands Now

Susan E. Morton, Forensic Document Examiner, San

Francisco Police Crime Lab, 850 Bryant Street, San Francisco, CA 94103, semortonsf@aol.com, 415-671-3196.

Objective: To describe the current status of the unsolved Zodiac case.

Relevance: To provide historical perspective of a long unsolved case of public interest and describe how the forensic evidence is being preserved.

Methodology: Paper items have been stored in archival materials.

Results: Fragile items have been preserved to the best of current capabilities.

Conclusions: If this case is ever solved, it will likely be by a scholar or historian. The physical evidence must be preserved for possible future use.

The California Forensic Science Institute Research Development Program

Katherine A. Roberts, Ph.D., California State University, Los Angeles, California Forensic Science Institute, Director of Research Development, 5151 State University Drive, School of Criminal Justice and Criminalistics, College of Health and Human Services, Los Angeles, CA 90032-8163, (323) 343-4625, Krobert2@exchange.calstatela.edu

The California Forensic Science Institute (CFSI) is a partnership involving the Los Angeles County Sheriffs Department, Scientific Services Bureau; the Los Angeles Police Department, Scientific Investigations Division; and California State University, Los Angeles (CSULA). The Institute is dedicated to the advancement of forensic science and criminalistics. Specifically, four central objectives have been identified: In-Service Training, Research Development, Career Development, and Public Education.

The Institute will serve as the training, research, and development arm of the Los Angeles Regional Crime Laboratory. In addition to LAPD and LASD, the Laboratory will house the School of Criminal Justice and Criminalistics, CSULA. The construction of this facility, to be located on the campus of California State University, Los Angeles, is scheduled to begin in Fall 2004.

The objective of this presentation is two-fold: to promote the services and mission of the CFSI and to solicit information for the purpose of building a program of research development. The goal is to collaborate with crime laboratories in designing and testing research in the application of advanced technology to forensic services. The CFST will be conducting a survey to identify the needs of state and local law enforcement agencies, and private organizations. This includes obtaining information on research interests and priorities (individual and agency), technology development, and training needs.

LC/MS/MS For Analysis and Screening of Drug Compounds

Tania A. Sasaki, Applied Biosystems, Mailing Address 850 Lincoln Centre Dr., Foster City, CA, sasakita@appliedbiosystems.com, 650-554-2258

Objective: To detect, verify, and quantify a variety of drug compounds in a complex biological matrix utilizing LC with mass spectral detection.

Relevance: LC / MS / MS can successful screen for a large number of compounds in a single analysis. Furthermore, quantitative and qualitative information can be obtained in a single experiment.

Methodology: Liquid chromatography with mass spectral detection.

Results: A method to successfully screen 23 drugs of abuse from several different classes in a single experiment was developed.

Furthermore, simultaneous detection, confirmation, and quantitation of 6 opiates was performed.

Conclusions: LC / MS / MS is a useful analytical technique that can be used for both screening and quantitation of analytes.

The Effect of Windshields on a Bullet's Trajectory

Michelle L. Dilbeck, Alameda County Sheriff's Office, 15001 Foothill Blvd, San Leandro Ca, 94578, (510) 667-7700, Mdilbeck@acgov.org

Objectives: The purpose of the study was to determine how much a deflection of a bullet's trajectory is caused by striking the windshield of a vehicle. Is there any reproducibility in the direction of deflection and the angle?

Methodology: Four different pistols of different calibers were used. Bonded ammunition and conventional jacketed-hollow-point ammunition were also used. Each pistol was placed horizontally into a vice and fired at least six times into a windshield set at a 30-degree angle and later a 0-degree angle and a foam board witness panel (one shot for each witness panel).

A bore laser was used after each shot to determine the "expected" impact on the witness panel. Measurements were taken and the angle of deflection was calculated using simple trigonometry.

Results: The angle of deflection was very small, less than 2-degrees in most cases. The conventional jacketed-hollow-point bullets deflected more than the bonded bullets, but the largest angle was still around 6-degrees.

There was no predictable pattern with any of the firearm-ammunition combinations. Some bullets deflected up and some down. The left-to-right deflection was also random and did not appear to be dependant on the direction of twist in the rifling.

Conclusions: Windshields do have an effect on a bullet's trajectory. This effect is minimal for the ammunition and firearms tested and the distances commonly encountered in a vehicle shooting reconstruction.

You cannot predict the direction of deflection based on the rifling in the firearm used.

Batting on Personal Safety in Archeology

Linda Wraxall, Criminalist Safety Officer, California Department of Justice, Jan Bashinski-DNA Laboratory, 1001 W. Cutting Blvd, Suite 110, Richmond, CA 94804, (510) 620-3381, Linda.wraxall@doj.ca.gov

The DNA Lab staff who volunteered to assist the Human Rights Center in the identification of human remains in clandestine graves in Guatemala had little or no outdoor crime scene experience. Therefore I did some background research on personal safety during exhumations, using the Internet to find published safety requirements for archeological digs. Most of these publications are generated from universities in the UK and provided a good framework for coping with adverse conditions. Information from two such safety manuals were given to our staff for their use and are presented here.

Exploding Gas Cans and Other Fire Myths

John D. DeHaan, Fire-Ex Forensics, Inc., 3505 Sonoma Blvd., #314, Vallejo, CA 94590, (707) 643-4672, Jddehaan@inreach.com

Criminalists who become involved with fire investigations are often faced with hypotheses about fire ignition and behavior that are accepted as fact by investigators, judges and juries. Some of these hypotheses are wildly misleading and can derail an investigation if not corrected. This paper will explore some of these myths and offer the results of tests that disprove them.

Myth 1: Gasoline cans or vehicle gas tanks explode when exposed to any flame, engulfing the unfortunate bystander.

Tests: A variety of containers full of gasoline were ignited by application of open flame to the vapors being emitted.

Results: No explosions occurred.

Myth 2: Gasoline is readily ignited by a glowing cigarette discarded nearby or by someone actively puffing on it.

Tests: A variety of glowing / hot surface ignition sources have been applied to gasoline vapors under a variety of conditions.

Results: No ignitions occurred.

Myth 3: Gasoline vapors mix readily with air and form a widely dispersed ignitable vapor/air mixture.

Tests: Ignition sources were applied to various mixtures.

Results: Ignition occurs only where the layer of vapor is in the flammable range.

Myth 4: A heavier-than-air vapor mixture will push out the bottoms of walls of a confining structure when deflagrating, while a lighter-than-air mixture will push out the tops of the walls.

Tests: Deflagrations in a test compartment having a highly stratified hexane:air mixture were ignited and the pressures produced were measured by transducers.

Results: Pressures on all internal surfaces were equal in magnitude and coincidental in time. Pressures equilibrate too rapidly in a typical deflagration to produce structural effects.

Conclusions: Unless the criminalist is prepared to counter these myths in an investigation, he or she may be ignored in the face of the "common knowledge" about fuels, fires and explosions.

Forensic Computer Examination Related to Pornography Tools to the Test —*People v. Jacobs*

Mario Soto, Criminalist, Santa Clara Co. District Attorney's Office, Silicon Valley Computer Forensic Laboratory, 70 West Hedding Street, West Wing, Fourth Floor, San Jose, CA 95110, (408) 792-2741, Msoto@da.sccgov.org

See how various computer forensic techniques were used in this particular case, and how this evolving discipline assisted in the investigation.

Ten Things You Can Do To Fix Your Three Most Common GC & GC/MS Problems

Greg Halstead, Service Representative, Full Spectrum Analytics, Inc., (925) 443-4080, ghalstead@fullspectrum-inc.com

There are hundreds, if not thousands, of problems an analytical chemist may encounter in the process of performing analyses. Other than hardware failures, software problems, and user errors, when you get down to it there are only three basic problems. These problems are: high background, poor chromatography, and low sensitivity.

High background exists in the three basic forms of elevated background, baseline rise, and ghost peaks.

Poor chromatography manifests itself in the form of poor separation, poor peak shape or peak tailing.

Low sensitivity can show up in the form of small peaks and / or high noise and system activity.

This presentation will outline a logical approach from perceiving a system problem, to determining and / or isolating the actual problem, to formulating a solution and testing the fix.

Forensic Scientists Without Borders and International Human Rights Investigations

Brian Harmon, Criminalist, Nicole Inacio, Criminalist, Christian Orrego, Criminalist, California DOJ, BFS, brian.harmon@doj.ca.gov, nico1e.inacio@doj.ca.gov, cristian.orrego@doj.ca.gov, Jan Bashinski DNA Laboratory, 1001 West Cutting Blvd, Suite 110, Richmond CA, 94804-2028, (510) 620-3300.

Guatemala suffered 36 years of civil war from 1960-1996 resulting in some 200,000 persons missing and presumed dead. Forensic scientists have a unique opportunity to aid justice and reconciliation in Guatemala through the collection and presentation of evidence from clandestine graves. The exhumation and identification of victims can also provide invaluable training to the forensic scientist.

In October of 2003, a team of volunteers from the California Department of Justice, Bureau of Forensic Services (BFS), traveled to Guatemala to assist the Forensic Anthropology Foundation of Guatemala (FAFG). The team was lead by Bureau Chief Lance Gima and accompanied by Isabel Reveco, a Chilean forensic anthropologist, and Michel Huneault, a social scientist / photojournalist with the Human Rights Center (HRC) at the University of California, Berkeley. The HRC sponsored the trip and has previously arranged visits and DNA training to Chile and Guatemala. This trip served to open the lines of communication between the U.S. and Guatemala forensic community, to assist and in turn be trained by the FAFG, and to explore the use of DNA identification when conventional anthropological methods fail.

The FAFG's highly skilled anthropologists and archeologists have spent years tracking down clandestine graves and identifying victims at the request of the courts. Over the past 11 years, the FAFG has recovered, analyzed, and reported on the remains of over 2,300 individuals from clandestine graves. In one study of 1,817 skeletons analyzed, 56% were successfully identified. The FAFG received the California team with great enthusiasm and worked together to recover twelve bodies at three gravesites in the Quiche region of Guatemala. The work was conducted under threats of violence to the foundation staff during one of the most controversial presidential elections in Guatemalan history.

Our presentation will discuss the volunteer trip, a photo documentation of the California team's experiences, and ongoing collaborations with the FAFG. We advocate that members of the forensic community can be "forensic scientists without borders" by aiding organizations that bring justice and reconciliation to the victims of human rights abuses.

GSR: An Airbone Particle Retention Study

Chip Pollock, Criminalist, Sacramento County District Attorney's Office, Laboratory of Forensic Services, 4800 Broadway, Suite #200, Sacramento, CA 95820-1530, (916) 874-9240, Pollockc@saccounty.net

This presentation will discuss the results from an airborne gunshot residue (GSR) retention study. The purpose of this study was to determine a time interval in which airborne GSR particles are likely to be present in the air after an individual has discharged a firearm. Our study consisted of an individual firing a single shot from a 9mm semi-automatic pistol and then collecting the airborne GSR particles on Scanning Electron Microscope (SEM) disks over a specified time period. The SEM disks were examined by SEM-EDS and the results of this analysis will be discussed.

HPLC/MS^n Dye Identification: From Fiber to MS "Fingerprint"

Lauren M. Petrick, Sacramento County District Attorney's, Laboratory of Forensic Services, 4800 Broadway St., Suite 200, Sacramento, CA 95620, (916) 874-9853, Lmpetrick@ucdavis.edu

The use of a high performance liquid chromatograph-ion trap mass spectrometer (HPLC / MS) in a forensic context is a new and potentially powerful tool, combining the flexibility of LC with the specificity of MS. Its application in textile dye identification will be discussed. The dye in a fiber was first extracted with minimal manipulation, and then analyzed with HPLC / MS^n in order to characterize its dye components. A case study was performed using acrylic reference and suspect fibers where data from both the MS and an UV / Visible spectrometer was collected and compared. The information allowed for an additional layer of discrimination that otherwise could not be obtained.

Elemental Analysis in Forensic Science: The Application of Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

Abbegayle J. Dodds, Senior Student Intern, Trace Evidence, Sacramento County District Attorney's Laboratory of Forensic Services, 4800 Broadway, Suite 200, Sacramento, CA 95820-1530, (916) 874-9240, UC Davis, Graduate Group in Forensic Science, Forensic Chemistry, ajdodds@ucdavis.edu

An introduction to elemental analysis by inductively coupled plasma mass spectrometry (ICPMS) will be presented in conjunction with its application to analyses of forensic importance.

Emphasis will be placed on its use for sample types commonly encountered in trace evidence, especially glass. In conclusion, a very brief overview of the research efforts hosted by Sacramento County will be given regarding the use of laser ablation (LA) ICP-MS.

Trace Evidence Resource Center Update: The Use of Pyrolysis GC/MS And Raman IR in the Trace Section

Raquel Paez, Senior Student Intern, Sacramento County District Attorney's Laboratory of Forensic Services, 4800 Broadway, Suite 200, Sacramento CA, 95820, (916) 874-9240, Rm_paez@yahoo.com

The Trace Evidence Resource Center grant has given the Sacramento County Laboratory of Forensic Services the ability to investigate the value of cutting edge instrumentation in the Trace section. This short presentation covers the use of both the Pyrolysis Gas Chromatography / Mass Spectrometry and Dispersive Raman Infrared Microspectrophotometry. Spectral libraries have been created on both instruments with standards such as polymers, fibers, automobile paints, minerals and low explosives. Sample preparation, method development, general data analysis and interpretation will be discussed.

An Evaluation Of Instant Shooter Identification (3 Minute Field Test) Gunshot Residue (GSR) Kits

Angela M. Hanson, Sacramento County District Attorney, Laboratory of Forensic Services, 4800 Broadway Suite 200, Sacramento, CA 95820-1530, (916) 874-9240, amhanson@ucdavis.edu

Instant Shooter Identification Kits (ISid) were evaluated and compared to standard gunshot residue testing by scanning electron microscopy with energy dispersive spectrometry (SEM / EDS). The ISid kit tests for nitrates using diphenylamine and sulfuric acid. ISid swabs and SEM samples for gunshot primer residue analysis were used to collect simultaneous samples from the shooter's hand at various post-shooting time intervals. The manufacture's 'screening instructions' were followed and all positive results were then prepared for SEM confirmation using the manufacturer's recommended procedures. All of these samples were then analyzed by SEM / EDS. We also evaluated the ability to confirm a positive nitrate test with SEM / EDS after the ISid kit had been stored for extended periods of time. Results of both of these studies will be discussed in this presentation.

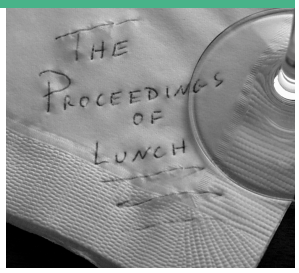
Forensic Odontology for Law Enforcement, Emergency Medical Personnel and the Military

Dr. George Gould, DDS, Diplomate, ABFO, Northern California Deputy Director, California Dental Identification Team, 6101 Puerto Dr., Rancho Murietta, CA 95683, (916) 354-4141, Drgag@calweb.com

This presentation will demonstrate the recognition, appropriate collection and scientific photography of dentally related evidence in pattern injuries believed to be bitemarks. In addition, there will be a discussion of my duties as an identification scientist at the US Army Central Identification Laboratory, Hawaii, related to the recovery of US military personnel from Vietnam, Korea, and World War II.

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!



Myth or Aphorism:

Sayings by which we live—
The Dogma of Forensic Science

Lunch today is convened at a Greek restaurant. We had previously decided to discuss the myths of forensic science, and so Greece, the source of many myths and gods, seemed like an appropriate venue for such a discussion. After ordering our non-Greek salads, we started with a few definitions.

***Myth*:** A traditional story of unknown authorship, ostensibly with a historical basis, but serving usually to explain some phenomenon of nature, the origin of man, or the customs, institutions, religious rites, of a people. Myths usually involve the exploits of gods and heroes.

Aphorism:
1. A tersely phrased statement of a truth or opinion; an adage.
2. A brief statement of a principle.
3. A comprehensive maxim or principle expressed in a few words; a sharply defined sentence relating to abstract truth rather than to practical matters
4. A short pithy instructive saying

Dogma:
1. A formally stated and authoritatively settled doctrine; a definite, established, and authoritative tenet.
2. A doctrinal notion asserted without regard to evidence or truth; an arbitrary dictum.

The practice of forensic science is just over a century old (depending on when you start counting), and in that time principles have been enunciated that guide the work of practitioners. We argue that there is still little consensus on what constitutes the core principles of the discipline, but in spite of this, certain maxims have been voiced that seem to permeate our work. We focus our discussion this day on a few of these sayings.

We wonder first how to classify them. Are they principles, maxims, theories, hypotheses, what? Norah suggests thinking of them as myths, explaining the rites and customs of a group of people. Keith suggests that they are also aphorisms, short pithy instructive sayings. Both agree that myths and aphorisms can turn into dogma, dicta that no longer resemble science or rational thought. Dicta requires rigid adherence to, and belief in, the "saying", rather than the principle behind the saying.

Here are four that came up while we were dining.

"One unexplained difference excludes the possibility of a common source"

There exists an aura of objectivity that belies the actuality (reality) of this saying.

Analysts believe that if, after their examination, one true difference is found between the evidence and the reference items, the items must have difference sources. But a closer look at several extreme examples reveals some hidden assumptions in this belief.

Take first the situation of a bloodstain found at a crime scene, and a reference sample from a suspect. Go back in history to a time when the laboratory could only perform ABO and PGM typing. If the ABO type is type A for both of the samples, but the evidence is a PGM type 1 and the reference a PGM type 2-1, we are satisfied with the difference and conclude that the reference and evidence stain cannot share a common source. Now consider an examination of these same samples at 13 STR loci that reveals 12 loci with matching types, and one locus with types that are different. At this point in the examination, we are suspicious of the difference. Why? Because it is difficult for us to believe that samples matching at 12 loci are not from the same person. While we concede that it is theoretically possible, in practice we have never seen it.

What is different between the two situations is our conviction; the more information we have, the more likely it is that we have made up our mind conclusively about the question of common source. Keith opines that this example reveals an unwelcome thought: the greater the number of high quality characteristics seen in both evidence and reference, the more suspicious we are that any observed difference should be explainable. In other words, it makes a difference how many matching traits you observe when deciding whether to pursue explaining a difference that at first blush appears unexplainable. As a point of clarification, combined discrimination power derives from both the number of traits and the discrimination potential of each. If you are examining evidence in which a few observable traits possess low discrimination power, one of which is different from the reference, you confidently conclude a different source for the evidence. But if you see 7 consecutive matching striae in a bullet comparison, followed by other areas of disagreement, you wonder if there could be a legitimate explanation for the difference. This might play out in two different ways; you may search for (and find or not find) an explanation for the difference, or you may dismiss true differences as inconsequential, or explainable, potentially concluding a false match. In either case, the aphorism "one unexplainable difference excludes," rests on a subjective determination of both what *constitutes* a difference, and how hard you will try to *explain* the difference. The hidden dogma here is that the amount and quality of agreement matters as much as the difference. We *expect* a certain number of exclusions based on authentic differences when poor discrimination, low quality traits are used; we *expect* no exclusions when many high discrimination, high quality traits have already been observed to match.

Whether we admit or realize it, a prior conviction, however tentative, exists on our part about the outcome, or possible outcomes, of our examination. Many factors influence that conviction, including our observations as we proceed with our examination. To resurrect another ancient serology example; semen was detected on a piece of evidence, and no ABO antigens were found. The lab analyst concluded a non-secretor semen donor, a reasonable conclusion given the results. This eliminated the defendant, who was an O-secretor. The DA related to the analyst that the victim's wallet was found in the defendant's dresser drawer. A semen sample from the defendant was obtained, and he was found to be an "inverted secretor," with far more ABH activity in his saliva than in his semen. An estimate of the semen dilution based on P30 levels in the evidence and reference semen samples showed that the H activity of the defendant would not be detected in the evidence if he were the donor. Based on these results, the defendant was not eliminated as a possible semen donor. What changed, and invited the analyst to seek an explanation for the difference? One unexplainable difference existed between the evidence and reference samples; strict dogma required an exclusion. But more information emerged, and the analyst looked harder for possible explanations for the difference. Based on additional information, one unexplainable difference became (legitimately) an explainable difference. In fact, it ceased to be a difference at all.

We suggest that analysts do have prior convictions, usually based on assumptions, and usually unarticulated. One might posit that the solution to the dilemma of prior belief and prior assumptions is rigid adherence to protocol, or blind testing of the evidence. Rather, entertaining multiple hypotheses, defining terms, and understanding our assumptions are the keys to proper and limited inferences based on the physical evidence in the context of the case. Some attorneys may call this analyst bias; we call it updating hypotheses based on new information.

We conclude that the saying, *"one unexplainable difference excludes …"* may contain more dogma than aphorism.

"Every contact leaves a trace"

The cornerstone of forensic science since the early 1920's has been a maxim attributed to Edmund Locard. It appears in two or three permutations in his writings, but the most comprehensive statement translates as follows:

No one can commit a crime with the intensity that the criminal act requires without leaving numerous signs of it: either the offender has left signs at the scene of the crime, or on the other hand, has taken away with him—on his person or clothes—indications of where he has been or what he has done. (Locard, 1923)

Locard himself never proffered this as a principle; his students and colleagues were the ones who transformed this simple *raison d'être* into a foundational principle of forensic science. In the process, Locard's musings were transformed into the definitive, "*Every contact leaves a trace*". In the same way that Quetelet's "*Nature exhibits an infinite variety of forms*" was adulterated to "*Nature never repeats herself*", (Thornton, 1986) subtle but important differences exist between Locard's original quote (1923) and the modern redux of it. Among other distinctions, the redacted version retains no mention of a crime; the reader is left with the impression (whether correct or not) that transfer is equally likely and equally important under any circumstance. Further, Locard implies that the criminal is acting under stress and with anxiety ("*the intensity that the criminal act requires*"). This leaves no room for the psychopathic criminal who feels no emotion whatsoever in the commission of his criminal act, and so does not experience the type of stress and anxiety implied by Locard. Nor does it allow for the serial criminal, who will perfect his crime's *modus operandi* with each new commission of it, reducing the chances of leaving traces behind. Neither Locard's original writings nor current interpretations explicitly address the possibility of transfer in both directions, although one might argue that Locard implies it. Our expectations with regard to cross-transfer impact on both the search for evidence and the interpretation of that which is found. For instance, an expectation that two-way transfer should occur might weaken an association for which traces of contact are not found in both directions.

After reviewing Locard's writings (1920, 1923, 1928, 1930) it seems to us far more likely that, rather than intentionally articulating a global principle, he was merely reflecting on the reasons why a careful scrutiny of the crime scene, including victims, suspects, and witnesses, was worth the effort. Frequently (or perhaps, in Locard's mind, inevitably) contact between two objects will be indicated by small traces of each left on the other. Find the traces, and contact is established.

The prolific work and influence of Locard have made him a mythic figure in forensic science; although no one seems to have elevated him to the status of a god, many consider him to be a hero in the field.

"Every item in the universe is unique", which leads to the belief that ***"Unique items leave unique marks"***

That every item is unique seems obvious and unassailable, if for no other reason than no two objects can occupy the same space at the same time. If forensic science were concerned with the examination of single objects, this observation would be central to its practice. However, the examination and interpretation of physical evidence requires, at a minimum, the con-

sideration of *two* objects: some evidence, and a reference. Norah reminds us that, although it is often misstated as "could the evidence have originated from the reference?", the correct question is "could the evidence and reference share a common source?" Therefore, we are not interested in the uniqueness of single objects, but rather, whether two items (evidence and reference) can be linked back to a single unique source.

It is tempting to believe that every item, being unique, has the capability of leaving a unique mark. However, when we begin our examination with an inspection of the reference representing the putative source, we lose sight of the more fundamental question: what is the universe of sources that could have left the evidence? The evidence defines which traits are important, not the putative source.

When a unique shoe leaves an impression in a surface, it will leave a mark that results from an interaction between the sole and the substrate. Because of this interaction, there cannot be a "perfect" transmission of all traits found on the sole. Therefore, the impression made is not a "perfect" representation of this unique sole. We are left with an impression that is not solely a product of the sole (pun intended). The resulting impression shows differences from the sole that result from the ability of the target (substrate) to accept the impression, as well as the manner of transmission. Because the impression is not a perfect representation of the sole, there exists the possibility that some other source could make a similar impression.

We frequently examine the reference sample, or sometimes even the putative source, to determine which traits will be useful in our examination. One might, for example, look for a trait on the sole of a reference shoe or in a reference mark made by it, and then look for that trait in the evidence print. In a case that Norah is currently reviewing, the examiner specifically testified that he first examined a set of reference hairs to determine the possible range of traits before examining the single evidence hair to determine if it would fall within the observed range of traits. As another example, if we find a red sweat shirt on the victim, we look for red fibers on the potential target (say, a pair of pants from the suspect). When this approach is taken, you start believing that hairs matching the suspect, or red fibers matching the sweat shirt, are important *before* looking at the population of hairs or fibers on the target, and you stop asking whether some other source could leave similar evidence.

Norah insists that it is legitimate to ask if there is evidence on the target similar to the putative source, but we (the criminalistics community) cannot allow it to be the only, or even the main, question asked. We conclude that the saying "unique items leave unique marks" is more dogma than aphorism, and acceptance of the saying as truth imperils the interpretation of comparison evidence.

"To a reasonable scientific certainty"

This phrase appears to come from the medical community, expressed as "…to a reasonable medical certainty." What may have evolved as the qualification of a physicians opinion to plan treatment options for a patient was transferred wholesale to the courtroom. Without judging if it is appropriate to medical testimony, we both agree that the phrase "… to a reasonable scientific certainty" has no place in testimony given by a criminalist.

Scientific certainty, reasonable or otherwise, simply does not exist. The phrase *scientific certainty* is, in fact, an oxymoron; science is, in part, about measuring imprecision. While the public may believe that scientists present findings in black and white, scientists themselves know they deal with matters that are shades of gray. We may come to possess a conviction about some matter on which we have gathered data and made a formal study, but that is not the same thing as scientific certainty.

Phrasing an opinion with these words relieves the examiner of some responsibility. The phrase delivers a patina of authority ("SCIENCE") that is not present in an opinion. If the jury hears, "This is my opinion on the matter," they factor this opinion into their consideration of the truth of the matter. But if the jury hears "scientific certainty," they think "truth" (which Norah believes is a short street to "guilty"). They reason that, if this scientific fact is undeniable, then the defendant must have committed the crime. To the laypersons who comprise the trier of fact, "reasonable certainty" subtly and insidiously morphs to "it is certain that…"

The phrase, "to a reasonable scientific certainty" is couched in terms that deny responsibility and command authority. It sounds objective, but in fact is not. All data goes through a human filter, and emerges as inference and opinion. To suggest otherwise is misleading and, dare we say, dogmatic.

But all dogma begins with some truth. Having completed the meal and paid the fine (oops, bill), we conclude that the kernels of truth at the core of these aphoristic myths are worth knowing and practicing with care.

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Al Moses

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Al was extremely conscious of the court reporters in transcribing what frequently would be very complex scientific explanations, names and spellings. He developed a page of scientific definitions that he would provide to the court. Many times when Al would walk into the room, the defense would enter into a stipulation with the prosecution to Al's considerable scientific abilities and qualifications.

Al's significant knowledge of chemistry has assisted in many criminal cases over the years. When his colleagues needed that special method or had some unusual question about chemistry, Al would either know the answer or within an hour or so have the original source to assist.

Al was an accomplished stamp and first day covers collector. He gave his colleagues stamps and covers that he thought would be of interest to them. He hosted and attended numerous stamp shows. He also published an article on stamp collection in a 1971 issue of TV Guide. Al and Alice supported the theatrical arts in and around their home in Fullerton and several of his colleagues were the recipients of many front row center tickets given by them. When he found out that one co-worker's son collected refrigerator magnets, Al would give him dozens of magnets over a period of time.

Al was also an avid sports fan. Few people knew of his passion for sports, but it was a common thread that he shared with others. One of his colleagues' youngest son played college baseball at Cal State Fullerton, just a few blocks from Al's home. Al would always keep him posted on how the Fullerton baseball team was doing. Al also followed the son's baseball adventures not only at Cal State Fullerton, but with the United States Baseball Team and in the pros. Newspaper clippings would show up from time to time, completely filling up two cardboard boxes.

Al's generosity was well known by many within the DOJ family. Al would give many hours of his unused, accumulated vacation time to those with health and family needs. Further, he routinely gave technical books to the laboratory's library and to individual members of the laboratory as well.

Al is survived by his son, Samuel, who was born in Maine and is now 52 years old. Al was proud of his son who is a CPA living in Santa Monica for the last 10 years.

On April 22, 2004, a "Celebration of Life" was held at the Department of Justice, Riverside Laboratory. The tribute was attended by Al's surviving family members, the laboratory staff, Assistant Bureau Chief Jay Mark, and representatives from the Riverside County Sheriff's Office, Riverside County District Attorney's Office, Bureau of Narcotic Enforcement and other forensic laboratories.

All of us have been enriched by his presence. He taught us not by actually teaching us but by example. His knowledge, kindness, humility and generosity will be missed by all.

Gary Asbury and Paul Sham for the entire BFS Riverside Lab staff
May 19, 2004

Alfred J. Moses
1921 - 2004

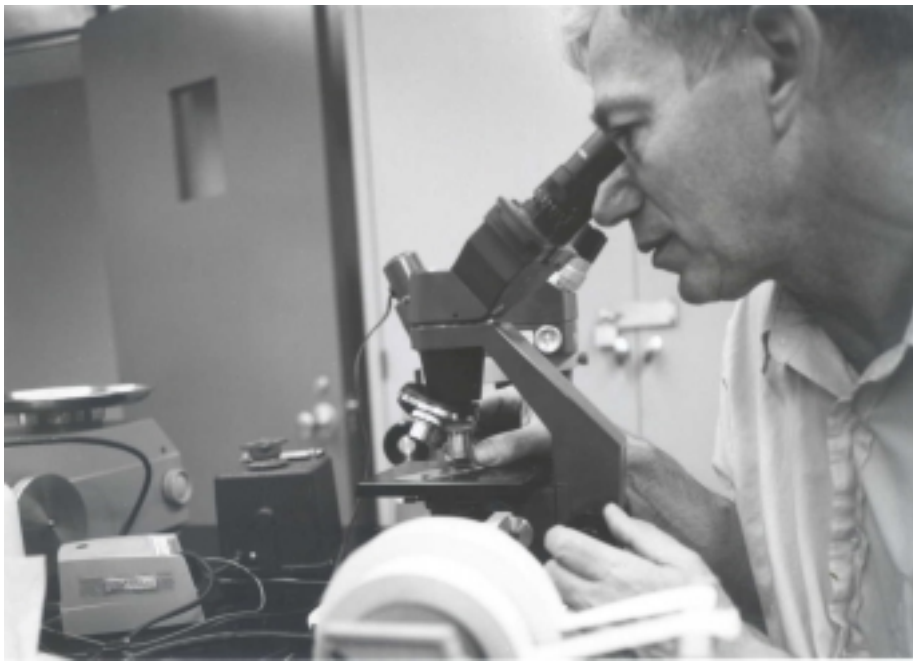
On April 7, 2004, the California Department of Justice, Bureau of Forensic Services, Riverside Laboratory lost one of its family members, Alfred J. Moses. Al died of apparent natural causes at home. He was found at his dining table, reading his Los Angeles Times and dressed for work. It is believed that at 83 years old, Al was the oldest full-time working member of the California Department of Justice.

Alfred J. Moses was born February 5, 1921, in Lorrach, Germany. The family and 17-year-old Alfred moved to the United States in 1938. Al's father, Samuel, was a physician and practiced medicine both in Germany and in Brooklyn, New York until he was 83. He passed away a few years after he retired.

Al served in the United States Army during the 2nd World War. He saw combat both on the German and Japanese fronts where he served in the light mechanized cavalry. Al received a purple heart when he was injured by a grenade during the fighting. He stayed in the reserves for several years until his complete discharge, leaving as a 1st lieutenant.

After the war, Al attended New York University and received his Bachelor of Art's degree in chemistry in 1948. He continued his education at Iowa State University where he obtained his Master's degree in chemistry in 1951. He was accepted at Boston University where he worked on advanced courses in chemistry and physics in order to fulfill course requirements towards his PhD degree. With his marriage to Alice and the pending birth of their first and only child, Samuel, Al left his studies to work full time.

For the next twenty years Alfred Moses worked in the nuclear science and burgeoning aerospace fields in Pennsylvania and California. His employers included Watertown Arsenal, General Electric Company Aircraft Nuclear Propulsion Department, Westinghouse Electric Corporation, Nuclear Corporation of America, Atomics International, AiResearch Manufacturing Company. He specialized in nuclear propulsion and power, working on such projects as reactors and fuel cell technology.



In 1972, at the tender age of 51 years old, Alfred Moses made a significant career change. He left the world of nuclear science and entered the world of forensic science.

During his approximate 20-year career in nuclear sciences, Al authored 4 books and submitted many scientific papers for publication. For 25 years, Al acted as an Abstractor for the Chemical Abstract Service, an arm of the American Chemical Society.

In 1972, at the tender age of 51 years old, Alfred Moses made a significant career change. He left the world of nuclear science and entered the world of forensic science. The West Covina Police Department hired Alfred as Supervising Criminalist for their drug and alcohol laboratory having two other forensic scientists under his wing. In 1973, the State of California, Department of Justice took over the West Covina Police Department Lab making it one of its satellite facilities. Al was brought into the State system as a Criminalist II of that year. In 1978, the State closed several of its satellite labs and Al joined the staff of the Riverside Laboratory.

Al's forensic specialty for the majority of the years was controlled substance analysis, although he was trained as a generalist performing work in trace evidence analysis and serology. Al even went to crime scenes at the age of 58.

In 1973, Al was invited by Los Angeles TV station KNXT (now KCBS) Channel 2 to be a guest speaker in a 36-part television series on alcohol and alcohol abuse. He received Bureau of Forensic Services' "Employee of the Month" award in April 1996.

Over the years he developed a reputation as of one of the hardest working criminalists at the Riverside Laboratory. He would arrive at the lab no later that 7:30 am and be at his bench working within 15 minutes of coming in. A quick tea or coffee break in the morning and back doing casework analysis. During his long tenure as a drug chemist he routinely would be the highest producer, at one point doing almost 60% of the entire drug caseload.

Al would sometimes indicate that what this lab needed was more "old foreigners" as he reflected upon his work output, and generally low-key approach.

With that incredible output came a continual stream of court appearances as an expert witness. Al became a known fixture at the Riverside and Indio courts. He would usually arrive early to speak to the deputy district attorney about his case and give the attorney a series of written questions to ask him while on the stand.

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October 25-29, 2004

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For more information, please contact Michael Parigian, Chair, 805-654-5517, michael.parigian@mail.co.ventura.ca.us

Photo: Ventura Visitor's and Convention Bureau