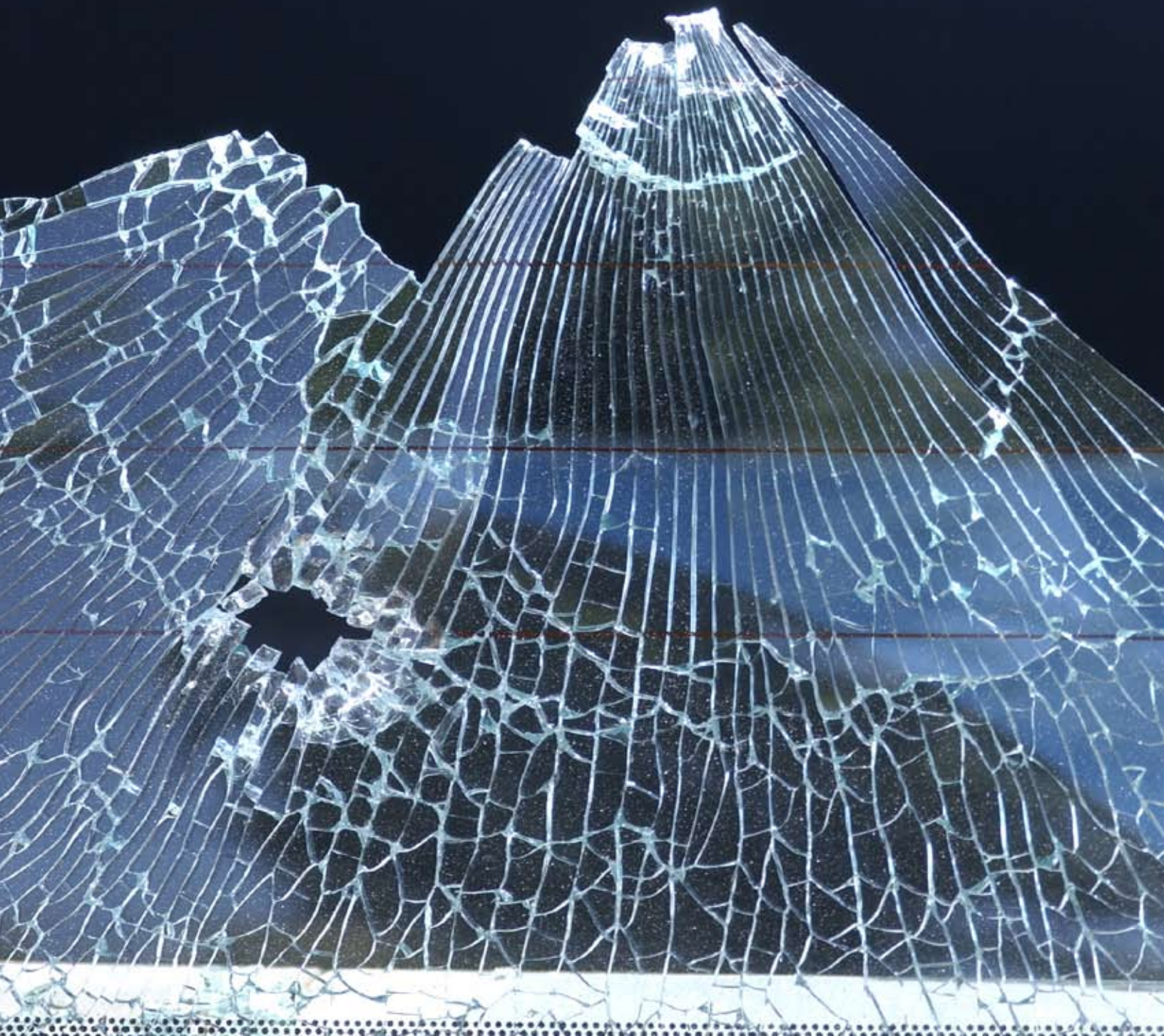


The CACNews

News of the California Association of Criminalists • Third Quarter 2006



The President's Desk

I AM HONORED to be serving this organization as president. I am following in the steps of many distinguished members and I will endeavor to do them proud with hard work and a dedication to you, the member, in an effort to improve our process wherever we can.

As a former president of the Association of Forensic Quality Assurance Managers, I know how fast a year goes by. As I promised you at the banquet of our spring seminar, the new board members and I are ready to hit the ground running.

Participation

I was very glad to see that we had two candidates for the president-elect position this year. So many times we only have one candidate and I would like to think that in the future having multiple candidates will be the rule rather than the exception. I cannot emphasize enough that the strength of an organization depends on the participation of its members. We have 600+ members and that means there is a wealth of great ideas and new energy out there and we need you to bring it all to the table.

You can shape the future of the CAC by taking a position of leadership, whether it is on a committee, chairing a committee or study group, or holding a board position. I have heard many of our members express a fear of taking on one of these positions of responsibility with a lack of experience. Well, that is where we all start. I had no experience when I chaired various study groups. I had no experience as an editor when I took over as *CACNews* editorial secretary. I had no experience as Southern Director when I became southern director.

We need members to express interest in the future board positions. We need you. Step up and step into the process. Give some of your time and effort towards helping CAC meet its future challenges! Do not sit back and expect that someone else is going to do it. Be a leader.

Ethics

The subject of ethics has recently come up on a number of fronts. The fact that the subject remains of high importance is a good thing, the idea that it has to stay in front of us is a necessary fact of life.

I will be giving an ethics presentation to about 300 high school students pursuing forensics as a career, at the State University campus here in San Diego in June. I have also been asked to talk on ethics at the QA manager national conference being held in Montana in October.

I just recently saw some discussion on the QA national email network on the issue of teaching or training lab employees on ethics. Our lab has just put together a formal training block on QA for all new employees, and this training block includes a module on the importance of ethics. It also includes a discussion of what kinds things can go wrong.

I thought it interesting that I could not remember the last time I had training on ethics. We have a new mayor in San

Diego who use to be the police chief. In light of our pension fund/city council scandal, the mayor has established a new office on ethics and integrity and they are starting a formal survey process of the important issues. The point is, there is action on this critically important issue that will result in some kind of training for city employees. We focus so much on EEO and workplace harassment that it is refreshing to see a new focus on ethics.

I just reviewed the CAC code of ethics. It is lengthy document. I realize the value of the lengthy code that includes an enforcement arm. But I wonder if we could have simplified the message; the simpler a mission statement is, the easier it is for your organization members to remember it on a daily basis. We could have said something like this:

Tell the truth.

Do the right thing even when no one is looking.

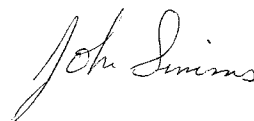
This simple code is easy to remember and it has daily application to our personal as well as our professional sides. Embracing this code will give us a true heading through any situation.

I was amazed to find a website that tracks lab scandals across the country. I used many of the situations from that website as part of the training in our lab to illustrate that no system is perfect whether a lab is accredited or not. I even had a few historical examples from our own laboratory to talk about! It all boils down to the individual. If an individual decides to ignore their personal and professional code of ethics, they will find a way to subvert a system. I believe that accreditation and QA systems do give you a better chance at finding the errant behavior sooner, though, rather than later.

Does your agency provide ethics training? When was the last time you discussed ethics? Is it something we just assume is always there? Do we tend to take it for granted and/or become complacent? We are required to train in safety on a regular basis for our physical well being in the laboratory. Why shouldn't we be required to train in ethics on a regular basis for the well being of our casework, the quality of our results, and the administration of justice?

What do you do when no one is looking?

Humbly,



You can shape the future of the CAC...



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Because of the computerized typesetting employed in *The CACNews*, submissions should be made in the form of MS-DOS compatible files on CD or by e-mail (ronald.nichols@atf.gov). Text files from word processors should be saved as ASCII files without formatting codes, e.g. bold, italic, etc. An accompanying hardcopy should be submitted along with the file. Graphics, sketches, photographs, etc. may also be placed into articles. Please contact the editorial secretary for details.

The deadlines for submissions are: December 1, March 1, June 1 and August 15.

Third Quarter 2006



On the cover...

A bullet hole in tempered glass can illustrate shot sequence. This glass was from the rear window of a van used as a target at the CAC Spring Seminar's "Shooting Scene Reconstruction" workshop, taught by Bruce Moran and Chris Coleman. The classroom portion is shown above. More scenes from the seminar inside this issue.

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CACBits



CAC member Steven Johnson, LAPD, is interviewed on Court TV's series, "LA Forensics." The episode, titled, "The Makeup Bomber" aired March 31.

Raymond Davis is "One Hundred"

A milestone of sorts was reached recently when Raymond Davis presented his 100th class on courtroom testimony at the San Diego Sheriff's Department Crime Lab. Raymond began this odyssey with his first class in Olympia, Washington in June 1988. Since that inaugural class he has presented his class to Criminalists in Nevada, Idaho, Utah, New Mexico, Washington, Louisiana, Florida, Oklahoma, Georgia, Arizona, CCI and at the FBI, ATF, US Customs & Border Protection labs. He's scheduled for classes in Austin, TX and Boston, MA later in the year.

IAI Invites CAC

Greg Laskowski, chairman of the Forensic Laboratory Analysis Subcommittee of the International Association for Identification (IAI) has posted a message on the CAC website inviting CAC members to attend, present and/or offer workshops at the annual conference of the IAI, to be held in Boston, MA July 2-7, 2006.



Deliberative Body

The CAC Board of Directors ponders the issues of the day at the Spring seminar in Concord. This was the final meeting for outgoing President Pennie Laferty, Membership Secretary Adam Dutra and Northern Director Linda Abuan. We thank them for their service!

Although IAI has active participation from many disciplines in the forensic sciences, membership and participation of the forensic laboratory analysis component of the IAI is lacking and he hopes the CAC could show our support by attending.

Ignitable Liquid Database On-Line

The National Center for Forensic Science offers a comprehensive database of some 400 GC/MS files of ignitable liquids. The database is searchable and the actual samples may be ordered for a nominal fee. Check out <http://ncfs.org/home.html>.



Time Running Out For Awards Nominations

Awards committee members Alicia Lomas-Gross and Mey Tann are looking for nominations of eligible CAC members for several upcoming awards. The nomination period for the Anthony Longhetti Distinguished Member Award and the Paul Kirk President's Award both close on July 1st.

New Faces

Congratulations to the newly elected members of the CAC Board of Directors: Julie Leon, President-Elect; Mary Hong, Recording Secretary; Eucen Fu, Membership Secretary and Shannon Cavness, Regional Director, North.



Also in attendance at this meeting was CCI Director Cecilia von Beroldingen, who solicited ideas from the CAC for classes of interest to the membership. She asked that suggestions be sent via the feedback link on the CCI's web page. <http://www.cci.ca.gov/>



AAFS San Antonio 2007: *Call for Papers*

The AAFS 59th Annual Scientific Meeting will be held in San Antonio, TX, at the Henry B. Gonzalez Convention Center, February 19-24, 2007.

Based upon results from a continuing education survey, the following topics are of particular interest:

- Ethics
- Elder Abuse
- Ethics for all forensic scientists
- More advanced state-of-the-art cutting edge technology
- More on gunshot wounds
- California has a substance abuse and ethics requirement
- Full day workshop on particular drug classes
- Missing and Unidentified, NCIC
- Fire investigation and emergency management courses
- Criminology, victimology, child abuse/neglect
- Testifying as a DNA expert (how to explain DNA to the layperson)

The call for papers and abstract forms are available in *Academy News*, mailed to all academy members, and on-line at www.aafs.org. Deadline for abstracts is August 1 FIRM

Hiram Evans
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CAC's Historical Perspective

Alex Taflya (Contra Costa SO) has assembled a powerpoint presentation consisting of dozens of historic CAC-related photos. This show was enjoyed at the recent spring meeting in Concord and Alex hopes to share it with the southern region at the October meeting in Temecula.

FORENSIC BOOKSHELF

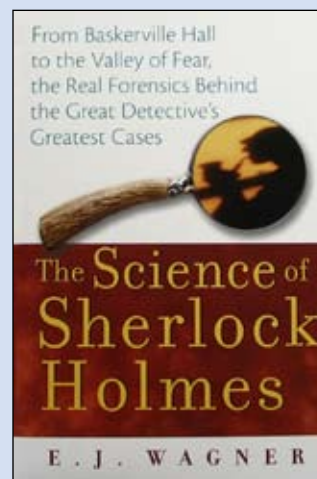
Watson Would be Pleased

Review by John Houde

"The Science of Sherlock Holmes"

by E.J. Wagner
John Wiley & Sons, Inc.
244pp, illus, bibliog, index
ISBN0471648795, \$24.95

There are only a few "crime lecturers and historians," as E. J. Wagner describes herself, and fewer still who care about the details of forensic science. E.J. is one. I first met Ms. Wagner in 2000 when she and her husband braved



Manhattan traffic to meet me and discuss my writing aspirations. I found her to be truly interested in getting the scientific details right in her presentations, and delighted to win the approval of forensic scientists. As a group, we can be quite sensitive about terminology, and when an author "gets it right," we like it.

No murder mystery this, but a seamless continuum of E.J.'s narrative spanning the writings of Arthur Conan Doyle as he wove real science into the fictional fabric of his characters. E.J. takes the reader on a tour, offering quotes from Sherlock Homes stories and then noting how the science of that time was applied, filling in details gleaned from actual scientific publications of the era.

Students of the history of forensic science will smile as they are treated to excerpts from "The Century of the Detective" by Jurgen Thorwald, and pearls from Alphonse Bertillion, Sir Bernard Spilsbury, Hans Gross, Edmond Locard, and even a fellow named Paul Kirk. Virtually every specialty is touched upon with emphasis on firearms, impressions, crime scenes, blood typing, trace evidence and toxicology. In addition, there is a nice treatment of a few areas that forensic science abandoned almost a century ago, including phrenology and anthropometry.

A few notorious cases of the Holmesian period are also included, such as that of the axe-wielding Lizzie Borden. At the conclusion of each chapter there is a short feature titled "Whatever Remains," where the author ties up a few loose ends with short comments on contemporaneous cases you may have heard of, including O.J. Simpson and the Lindbergh kidnapping.

All in all, this book deserves a place on the crowded shelf of any criminalist curious about the beginnings of our profession.

The Editor's Desk

Welcome...

The CAC Board of Directors welcomes some fresh voices including Julie Leon of Ventura County, Eucen Fu of the LA County Coroner, and Shannon Cavness of the Oakland Police Department. It's not that the old voices were stale but when I figure I started in this profession when they were still in school (probably high school) I just realize how stale I might be getting!

Giants, what Giants?

It's June and it's still hockey season! Not only that but as of this writing, the team I grew up with, the Buffalo Sabres, won a stunning game in overtime to push their series to a game seven. One more victory and it's the Stanley Cup Finals!

Help...

650 some odd members in this organization—you would think we could get some more people interested in writing something of interest for the association. Seriously, do you really want to continue reading my ranting, raving and sometimes humorous anecdotes?

Recently...

Bob Blackledge retired from NCIS—the real place, not the television series. Bob has been an innovative and valuable member of this association for a long time. However, we do not expect him to be disappearing anytime soon!

Dot, dot, dash, dash...

What's in a dash? Go through a cemetery and you will find headstones having two dates separated by a dash. I know when I would find myself in a cemetery (usually because someone I know just passed, I do not make a habit of roaming those things) I would think about what was filled in between the two dates. What's in the dash? Have you ever thought of what you want in your dash?

In the first several issues of the *CACNews* under my care we were tasked with obtaining memorials for some of our members and friends who had passed away. Some of the names have included Stuart Kind, Mary Graves, Jack Cadman, David Burd, Al Moses, Bill Corazza, and Jan Bashinski. For all but one issue of my first term as editorial secretary, there was a different one published. I was beginning to consider placing an open letter in the *CACNews* that called for members to place one on file with us so we can use that, "Tell us how you would like to be remembered."

Often we see a dash with a lot of accomplishments. Ulysses S. Grant—Civil War hero for the Union. Richard M. Nixon—China and Watergate. Charlie Chaplin—silent movie comedian. Jimmy Stewart—*Mr. Smith Goes to Washington*, *The Philadelphia Story*, and *It's a Wonderful Life*. Babe Ruth was arguably the best baseball player ever to have played the game.

There are times we might see a dash with accomplishments and maybe, just maybe some insight into the person. George Washington—the Father of our country. He also is the one who reportedly said, "Yes Father I am the one who chopped down the cherry tree." Okay, this is probably anecdotal but we got some insight into his honesty. Speaking of honesty, how about "Honest" Abe—the sixteenth president, the one who helped bring an end to slavery? Quite accomplished no doubt. At the same time his name is nearly synonymous with honesty.

There are two ways in which we can be remembered—for our accomplishments and for who we were as a person. The former is about doing while the latter is simply about being. Accomplishments are important—at the same time, sometimes we get so caught up in the doing of something that we lose sight of simply being with those around us.

Accomplishments are important and it is often said that no one remembers who came in second. Well, that's almost true. I am a Buffalo Sabres fan and I can remember every time (both times)

There are two ways in which we can be remembered—for our accomplishments and for who we were as a person. The former is about doing while the latter is simply about being.

they came in second! Maybe that's in part what pushes us so hard to achieve. For the most part we do want to give our best effort and be the best we can be. So, we work hard—we work hard to get the best positions, the nicest house, and enjoy the best restaurants we can afford. Unfortunately, just like the dash on a headstone has a defined beginning and end, so do our accomplishments. So



Ron Nichols
CAC Editorial Secretary

much of our doing (sometimes at the expense of our being) is caught up in things that have a limited lifespan.

The time spent simply being is time invested in lives of others. Invested properly, it will encourage others to do something similar. There was a movie called *Pay it Forward* in which a grade school boy ideally thought if one person invested in the life of three others and each of those three in three others, one person could impact the lives of nine others pretty quickly. I remember when my wife and daughter came home from watching that movie. I asked them how it was and they said great except for the ending. But, the ending was the key. However he understood it, this young boy had such a grasp of the power of investment in the life of another that he was willing to sacrifice all he had just to do it. And that's precisely what happened. As the movie came to a close, there was an endless line of vehicles waiting to drive by the memorial set-up for that young boy. His dash was endless.

What do you want your dash to say? Better yet, is there anyway that you could so influence the life of another that your dash does not end the day that it is engraved? Until next time, my best to you and your families.

Row

Correction & Update

I would like to correct some information that was included in the article "Islands in the Concrete: A Reconstruction." [*The CACNews*, 2nd Quarter, 2006, pg 29]. My name was misspelled which also resulted in an incorrect email address. The correct spelling is Katina Repp and the correct email is katina.repp@doj.ca.gov. The "islands" that were mentioned in the paragraph only appeared in the concrete garage floor.

As an update, we were able to reproduce the "islands" during experimentation at the Central Valley Laboratory. Federal brand .38 Specials loaded with Hydra Shok bullets were fired from a Taurus Ultra-Lite revolver at 60, 70, 80, and 90 degrees at an epoxy painted concrete target. A precast concrete manufacturer made the targets for us by using five gallon buckets as molds. After pouring, they steam-cured the concrete. The resulting targets were about 5 inches thick with a break strength of 4500-5000 PSI. Epoxy paint was used to coat the targets in an effort to duplicate the conditions at the crime scene. The "islands" were reproduced at the 80 and 90 degree angles. Please feel free to contact me for any clarifications.

*Katina Repp, Senior Criminalist
Central Valley Laboratory, 209-599-1413*

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Method Validation: A Brief Discussion

by Jack Wallace, Ventura Sheriff's Crime Lab

From time to time, persons ask me what is needed to validate a method. Often such questions come in the form, "You expect me to do what!" From these experiences, I have come to the opinion that much of this concern arises from misunderstandings, and I hope the following discussion will clarify some of these issues.

What is method validation?

Over the years, in an effort to facilitate discussion of this important topic different professional organizations have variously defined the term "validation". In typical abstract form, ISO has defined method validation as "the confirmation by examination and the provision of objective evidence that the particular requirements for a specific intended use are fulfilled."¹ Although focused primarily on issues surrounding DNA analyses, the Scientific Working Group on DNA Analysis Methods has provided a more expansive definition generally applicable to testing laboratories. This group defines method validation as "the process by which the scientific community acquires the necessary information to (a) assess the ability of a procedure to obtain reliable results; (b) determine the conditions under which such results can be obtained; and (c) define the limitations of the procedure."² However stated, method validation consists in providing the data demonstrating that a method works as the laboratory purports it to work. Data used for this purpose may be from a variety of sources, but must be sufficient to satisfy the standards of the applicable scientific discipline.

In this context, the term "method" refers to a step-by-step procedure for obtaining a result. That is, a laboratory does not validate a generic GC/MS protocol, but rather a specific set of actions and conditions that are applicable to specific compounds in particular types of samples.

Examples of method validations are found in essentially all types of testing laboratories:

* A laboratory responsible for measuring the heat con-

tent of natural gas shipped from Texas to California may need to prove its method is accurate to 0.1 BTU/CF.

* A laboratory analyzing foodstuffs for pesticide residues may need to prove it can detect a suite of organophosphates at concentrations of 0.1 ng/kg or more.

* A forensic laboratory may need to demonstrate that its method correctly identifies phentermine to the exclusion of all other substances that might reasonably be present.

As suggested by these examples, it is the end use of the data that sets the course of the validation.

Is method validation always required?

Yes, in the sense defined above. Validation is needed for any method used to generate results reported to a client. But there is a range of approaches that apply, as discussed below. Perhaps the most important variation on this requirement is that "standard" methods can be implemented with a minimum validation effort on the part of the laboratory.

Method validation sounds unreasonably expensive for a routine testing laboratory? Is this correct?

Persons expressing this concern may have been exposed to method validation studies completed by standard setting agencies, such as the AOAC. Such validation studies can in fact be quite complex, in keeping with the role of such agencies in providing rugged methods suitable for nationwide application. However, as defined above, validation of a method can also be quite simple, requiring, for instance, little more than testing of positive

and negative controls. The extent of testing depends on the context in which the test is used, the availability of supporting information in the literature, and other factors.

This concern is likely at the root of much of the anxiety regarding method validation. But competent laboratories have always taken the steps necessary to prove the validity of their methods, and nothing more is expected here. In this context, the only approach that might be unreasonable would be the use of a non-validated method.

Can you give an example of a simple method validation?

Let's say your drug laboratory has a GC/MS procedure that is already validated for the ten most commonly encountered steroids (out of sixty or so that are currently controlled),



and that you receive a sample exhibiting steroidal properties but not matching one of your target compounds. By examining the literature and databases for other known steroids, you will likely identify a short list of potential compounds, which can then be injected on your instrument. If your retention time and mass spectrum match, and if you can exclude other compounds based on the available information, you have validated this method for the identification of this particular compound. Of course, this approach assumes that your analysts stay informed regarding newly released steroids, and that they have access to the necessary structural and mass spectral data.

Here is an even simpler example: Suppose a suspect claims he couldn't have committed the burglary because at the time of the crime he was working at a local starch processing plant - that he was cleaning out a tank, and that his clothes were badly soiled from this activity. To check this story, the detective asked the laboratory to test the confiscated clothes for the presence of starch. In response, the examiner decides to screen the evidence with the classic starch-iodine test, a task that he begins by referring to an analytical handbook to refresh his memory on the necessary conditions and limitations for this test. After the initial tests prove negative, the examiner obtains a sample of the starch processed by this factory and demonstrates that this particular type of starch does in fact give a positive response to iodine. With an eye towards possible interfering substances, this examiner also inquires as to other products manufactured at this plant that might also be on the suspect's clothes. Finally, the examiner tests positive and negative substrate controls to demonstrate that this test is free from interferences for this type of material, and that it gives appropriate responses for the amounts of starch that would be found on soiled clothing. With this basic information in hand, the examiner could then evaluate the negative results with confidence.

The use of standard methods sounds promising. Tell me more.

Over the years laboratories have recognized the burden of requiring that each laboratory validate its own methods independently. Meanwhile, professional organizations and government agencies have realized the need for consistency between the numerous laboratories. These factors have led to the development of extensive collections "standard methods."

Standard methods are typified by the following elements:

- * They are issued and approved by professional or governmental agencies, typically after review by various technical experts.
- * They provide detailed descriptions of the analytical conditions sufficient to assure reproducible performance among the user community.
- * They are based on a validation study that is available to those using the method.
- * They describe the scope and limitations of the method to assure it is not used beyond what is supported by the validation study.

The virtue of standard methods is that the laboratory need not repeat the validation study, providing they can demonstrate that their systems are working as required by the method.

In a sense, we can think of standard methods as one end of a continuum: on the one extreme are entirely new methods, where the laboratory must generate all the supporting data itself; and on the other hand are standard methods, where supporting data has been completed externally to the extent feasible. In practice, many situations fall somewhere between these extremes, where the laboratory may make use of some external data (such as reputable journal articles and spectral libraries) but still needs to generate significant data internally.

Historically, forensic laboratories have not employed standard methods for controlled substances, although these are analyzed by nearly every forensic laboratory in the country. More recently, though, there has been a trend towards methods that arrive with much of the validation work completed, for instance, in the form of complete systems for immunoassays and DNA typing. In these instances, much of the validation work may have been completed by the vendor.

Those desiring examples of standard methods may find it helpful to visit the website www.epa.gov/sw-846/main.htm, or to refer to a volume such as "Standard Methods" for plentiful examples.

Essentially every forensic laboratory in the US employs GC/MS for the determination of controlled substances. Does this qualify this method as standard?

No, in two regards. First, GC/MS is not a method, but a platform for implementing a limitless number of methods. Second, methods are only considered "standard" when they meet the criteria given above. Of course, the fact that a procedure is widely used does engender some confidence, but what is needed here is data.

So how does a laboratory start a validation study?

Validation studies vary greatly in formality and complexity but generally you will need to complete these steps:

- * Define the end use. Validation can be described as showing "fitness for purpose,"³ and accordingly, one begins a validation study by first understanding the purpose for which the analysis will be performed.
- * Understand the sample. If you plan to validate a method for benzodiazepines in urine, you will need to know what benzodiazepine-like compounds you might encounter in urine, including likely metabolites, and in what concentration range. You would also want to know if there are characteristics of this matrix that might complicate the analysis. Similar comments apply to other methods.
- * Prepare specific objectives. For instance, if you are validating a method for identifying controlled substances for a court of law, your objective might be to show that the method uniquely identifies a particular list of compounds to the exclusion of all others. Specific objectives relate to those parameters that describe the performance of a method such as selectivity, detection and reporting limits, precision and accuracy, ruggedness, dynamic range, and false negative and false positive rates. Other topics of interest might include the stability of target analytes or the ruggedness of the method.
- * Review the literature. Depending on the complexity of the method and your previous knowledge, a literature review may be in order.

* Collect the data, and when needed, make the necessary adjustments in the method.

* Summarize and document the results and conclusion.

That's all well and good, but what about the details? How exactly does one show that a GC/MS protocol will uniquely identify a particular compound, or that a capillary electrophoresis procedure is capable of distinguishing DNA fragments differing by one base unit?

Modern methods of analysis rely on principles of operation that guide the validation process. Thus, for GC/MS methods, we know that compounds in a homologous series elute in regular progression, so that once we have shown that we can separate compounds differing by one unsaturated bond, we have greatly limited the number of potential interferences. Likewise, we know that capillary electrophoresis separates DNA fragments on the basis of molecular size, and for this reason once we have shown that we can separate fragments differing by one base unit over the range of interest, we need not repeat this for every possible fragment we may encounter.

In addition, the nature of the sample and the intended use of the data weigh heavily in deciding the course of a validation. Thus, knowing that your sample is blood from a living subject greatly limits the number of possible compounds you might encounter, and the standards applied to screening methods are quite different from those applied to confirmatory procedures.

You still haven't told me exactly what I need to do.

That's true. An expert in the field must direct the validation effort. There is no shortcutting the years of study and experience that are needed here.

Then how do I know when my validation study is complete?

It is complete when you have provided enough information to convince experts in the field that your method is doing what you claim it can do.

Does this mean that a committee must review every validation, no matter how minor?

No, it does not. This issue is determined by the policy of your laboratory, or in the case of standard methods, by that of the issuing agency.

And I suppose we need to keep records of this?

I thought you would never ask. Records should allow the laboratory to confirm the efficacy of the method, even if the original analyst departs.

It might be helpful to think in terms of a trainee in your laboratory, who will need to develop a level of confidence in the methods he or she is expected to perform. For this purpose the conscientious analyst will need a coherent set of data demonstrating the efficacy of the method in question, and a well-written validation report might go a long ways towards this end.

What about methods that have been in use for decades? Can we "grandfather" these in?

In my opinion, it is hardly fair to expect a laboratory to produce records of this sort from another era. But this does not mean that your laboratory can continue to use a method simply because it was used by your grandfather. If the method has been in regular use for some years, the lab should have supporting data generated from daily use, or from training exercises, or from the literature that supports its continued application.

Is validation the same as verification?

No. Verification is the process of comparing something to a set of specifications. For instance, your lab might verify that its new microscope can distinguish features separated by one micrometer, or that a new computer program transfers data correctly, or that an ICP can detect arsenic at a concentration of 1 ng/mL. None of these verifications demonstrate that a particular method carried out on these instruments is satisfactory and are thus not considered to be validations.

But there is a gray area here. If you purchase a dedicated analyzer, say, for breath alcohol, and then demonstrate that it can indeed determine alcohol with the accuracy and precision specified by the manufacturer, have you completed a verification or validation? In my opinion, the best approach is to avoid such semantic issues.

Where can I find more information on this fascinating topic?

For detailed accreditation requirements, refer to the latest version of ISO Standard 17025. Validation requirements are found in section 5.4 of the 2005 edition version of this document.

In addition, various professional groups have published guidelines pertinent to their fields of interest. Such groups include the SWGDRUG for the analysis of controlled substances;⁴ SWGDAM for methods of DNA typing;⁵ Eurochem for general laboratory testing;⁶ NCCLS for various clinical assays;⁷ and the AOAC, primarily for foodstuffs;⁸ and others.

And now it's my turn to ask you a question: At the start of this conversation I stated that validation data must satisfy the standards of the applicable scientific discipline. For forensic laboratories, what is the "applicable scientific discipline?" Does this refer to the standards of practice in other forensic laboratories? For toxicology methods, should we look to the community of clinical chemists, or for drug methods should we rely on the standards of proof accepted by the general chemical community?

References

- 1 Section 5.4.5.1 ISO 17025:2005
- 2 Forensic Science Communications, July 2004.
- 3 <http://www.eurachem.ul.pt/>
- 4 Scientific Working Group for the Analysis of Seized Drugs Recommendations, 2006.
- 5 Revised Validation Guidelines, Scientific Working Group on DNA Analysis Methods, Forensic Science Communications, July 2004.
- 6 <http://www.eurachem.ul.pt/>
- 7 NCCLS, Wayne, Pennsylvania.
- 8 www.aoac.org



CAC Regional Director's Reports

Northern Section

Linda Abuan, Director

The Sacramento County Laboratory of Forensic Services hosted a dinner meeting on February 16, 2006 at Andiamo Restaurant in Sacramento.

The guest speaker for the dinner meeting was Dr. Ruth Ballard, an Associate Professor with the Department of Biological Sciences at CSU Sacramento. Dr. Ballard's presentation topic was "When Cupid's Arrow Strays: Paternity Testing in Forensic Casework". Thirty individuals attended the dinner meeting.

Prior to the dinner meeting the following study groups met: DNA, Trace, QA/QC.

The DNA Study Group had eighteen individuals in attendance. Matt Seliga of Promega gave a presentation entitled "Maxwell™ 16 & Tecan Freedom EVO® Platforms for Automation with DNA IQ™." Steven Myers of the Jan Bashinski DNA lab gave an update on the Arizona database adventitious matches. After the presentations the group discussed possible workshops for the 2008 CAC Seminar and PCR Inhibitors & schemes for profiling success.

The Trace Study Group had nine individuals in attendance. There was a presentation on the Feasibility Study of Correlating Composition and Supplier of Glass by LA ICP-MS conducted by the Sacramento County lab and UC Davis. There was also a brief introduction on the Evaluation of UV Radiation Absorbing Compounds in Textile Fibers Utilizing HPLC/MS study that is going to be conducted by the Sacramento County lab and UC Davis. After the presentations the group discussed the 2005 GSR Symposium, new fibers being introduced to the consumer textile market, future Trace Study Group manufacturer tour ideas and future Trace Study Group meeting topics.

The QA/QC Study Group had five individuals in attendance. The group discussed record keeping databases, the Statement of Qualification from the San Diego SO, Training, Proficiency Tests and Safety from CCCSO, and Document Management for Electronic Manuals.

The next Northern Regional dinner meeting will be hosted by the Jan Bashinski DNA Laboratory in Richmond.

Southern Section

Wayne Moorehead, Director

On April 13, 2006, a Southern study group luncheon was held at the National University Spectrum Center in San Diego.

Dr. Peter DeForest was the guest luncheon speaker who discussed philosophies of criminalistics including why having a scientist involved at every step of the evidence process is important.

The trace, DNA, forensic alcohol, and toxicology study groups met. Toxicology had a speaker, an attorney, discuss topics and experiences in courtroom toxicology.

The cost of the lunches was \$290.00 while the funds received were \$260.00. The next anticipated study group meeting will be late July or early August.

UP & Coming

**Fall 2006
Riverside DOJ (Oct 9-13)**



*** NORTH-SOUTH HOST
SEASONAL SWAP OCCURS ***



**Spring 2007
Orange County**

**Fall 2007
Jan Bashinski Lab (Richmond)
DOJ DNA**

**Spring 2008
San Diego PD**

**Fall 2008
Sacramento County DA Lab**

**Spring 2009
San Bernardino**

**Fall 2009
Santa Clara County**

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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 or ON THE WEB. Visit www.cacnews.org to see what is offered. Content changes periodically, so visit often!

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Luke Haag generously granted the CACNews permission to reprint a few choice slides from his two-part presentation at the Concord seminar. Part one described the behavior of bullets impacting wood generally, and part two recounted Luke's investigation into President Lincoln's first experience with a new repeating rifle, as he fired it into a small wood target. The target was thought to have been lost for decades, but when Luke found it at a museum in Illinois, he couldn't resist applying his analysis.

The Lincoln Target Board

Summary and conclusions

Bullet holes in wood have characteristic features to include the deposition of 'bullet wipe' around the margin of the entry site.

Both copper and lead residues can be detected in such bullet wipe for many days and even months after the event.

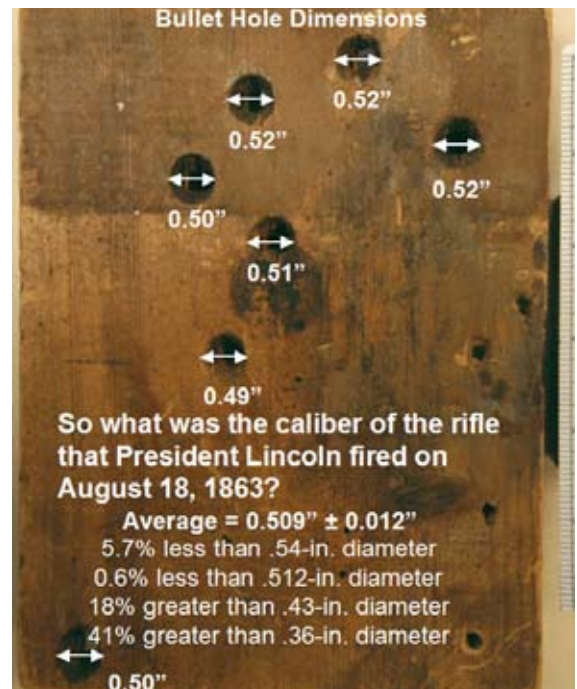
Lead bullets leave a continuous trail of lead along the path such bullets produce whereas copper jacketed bullets leave bullet wipe but little or no detectable lead along the bullet's path.

The diameter of bullet holes in wood (properly measured) bears a close relationship to the diameter of the responsible bullet. (typically within $\pm 5\%$ or less of the responsible bullet's diameter)

The predominant result was an undersized hole relative to the diameter of the bullet.

Impact velocity and bullet composition appears to play little or no role in the resultant diameter of a bullet hole in wood so long as the bullet penetrates several inches into the wood or perforates a board.

Bullet nose shape, as expected, has a bearing on the 'sharpness' of the margin of a bullet hole in wood.





Spring 2006 in Concord

The last northern spring seminar for awhile was a smashing success at the Concord Hilton. This was a joint meeting with the Forensic Science Society, and was hosted by the staff of the Contra Costa Sheriff's Lab. The event attracted around 200 attendees who enjoyed excellent weather, great workshops and interesting speakers. The hotel even pitched in with an impromptu 11pm fire drill. The photos on this page and the two following are from the "Shooting Scene Reconstruction Workshop" presented by Chris Coleman and Bruce Moran.

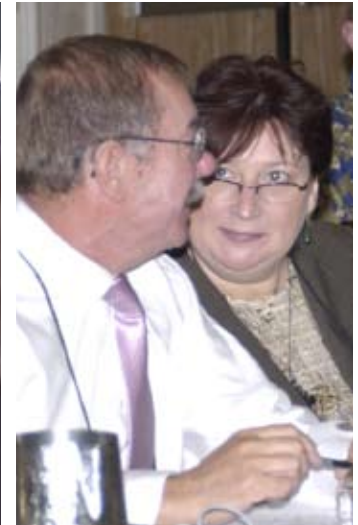


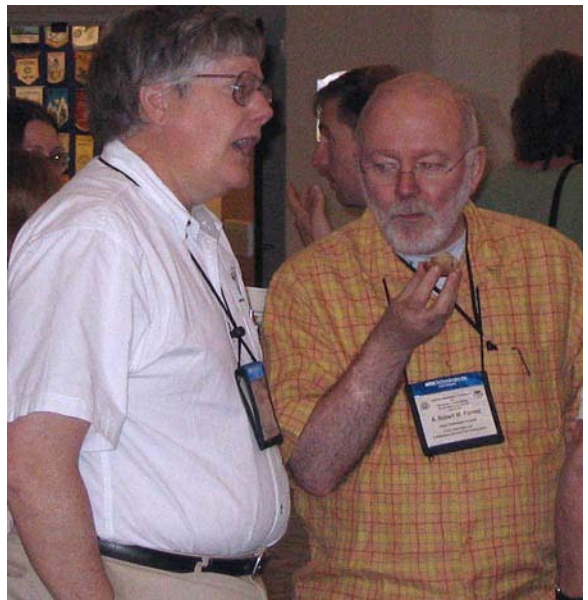
Spring 2006 in Concord





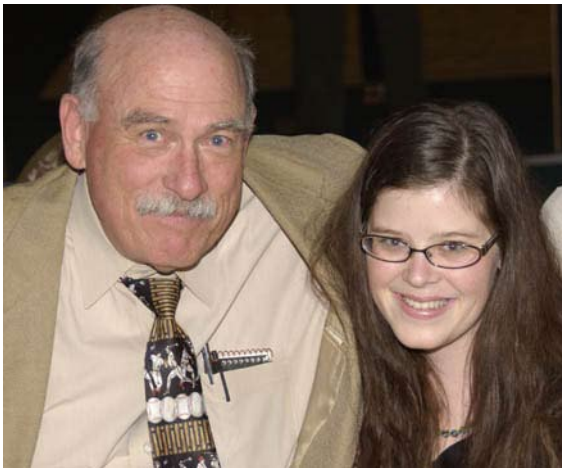
Spring 2006 in Concord





Spring 2006 in Concord





Spring 2006 in Concord



See you in the fall
in Temecula!

ABSTRACTS

FROM THE

2006 SPRING SEMINAR

The Middle Years: Criminalistics 1949—1979

Duayne J. Dillon, Dcrim

A brief review of the Berkeley Criminalistics Program, and three California Criminalistics Laboratories. Included will be the presenter's impressions of the academic program and observations the laboratories' organizations, staffing and technology. The presentation will include period photographs.

Technological Advances in Criminalistics Accompanied by Scientific Vacuums

Peter DeForest, PhD

John Jay College / CUNY New York

Since I began my career in criminalistics in 1960, I have witnessed extensive and profound changes in the field. The most patently recognizable of these have been in the areas of growth and technological advances. For the most part these changes have had a positive impact on the field. My main concern in this paper will be some less visible changes that I view as negative. In a real sense, the potential contributions of the positive developments have been offset to a significant degree by these other factors. By any measure, growth whether specified in terms of numbers of laboratories, laboratory size, or number of scientists employed as criminalists, has been striking.

As alluded to above, there have been some negative consequences of the rapid and sustained growth of the field of criminalistics over time. For one, the demand for forensic laboratory services has outstripped the increased capability derived from the funding gains attributable to growth. Criminalistics laboratories remain under-resourced. Training and mentoring have also suffered as a consequence of growth. Advances in technology have provided a succession of powerful new tools for use by the criminalist. These tools have greatly improved the quality and quantity of information derived from the analysis of many items of evidence. However, again, there have been important unintended negative consequences, which remain largely hidden to those outside the field and, unfortunately, to some within the field as well. With the powerful capabilities that our tools provide, it is easy to lose sight of the fact that there is often more to case solutions than the compilation of analytical data on individual items of evidence. For each investigation greater emphasis needs to be placed on recognizing all of the relevant physical evidence and in developing a scientific understanding the information latent in it. Steps need to be taken to develop a wider recognition of the problem. Strategies are necessary to bring about the needed changes. Possible steps and strategies to accomplish these goals will be discussed. Illustrative case examples will be used as time allows

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Borescopes for Forensic Applications— Understanding the Optics

Ken Harrington

Technical Advisor to Association of Firearms and Toolmarks Examiners

Optics: Rigid vs. flexible, resolution, contrast, alternative optical designs, diameter, length, field of view, magnification, direction of view, prisms vs. mirrors, articulation, lighting, and image documentation.

Images: Sample "thru-the-borescope" images of firearms, cartridge cases, a sabotaged barrel, and of bullets lodged in a wall.

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R -v - Palmer: A Victorian Poisoning Case with Lessons for the 21st Century

A Robert W Forrest

Consultant in Clinical Chemistry & Forensic Toxicology, Sheffield teaching Hospitals Foundation NHS Trust & Professor of Forensic Chemistry University of Sheffield

Alfred Swaine Taylor was born 200 years ago in 1806. He was arguably the most distinguished English Toxicologist of the 19th Century. (I say English, rather than British, for the Scots could make a convincing case for the primacy of Christison in the hierarchy of British Toxicologists). R -v - Palmer, was possibly his most important case. It still has relevance today.

Dr William Palmer was member of the Royal College of Surgeons providing general medical services in the Staffordshire market town of Rugeley where he had been born in 1824. Like many modern doctors and nurses who come before the Courts on homicide charges he had had some difficulties as a student. Nonetheless, he had become a popular and reasonably successful practitioner in his home town, with a particular reputation as a bonesetter.

He developed a taste for the life of the turf, and by the time of his trial he had virtually given up his medical practice to concentrate on training his string of horses. Dept, not surprisingly, became a problem. He used his knowledge of the pharmacopoeia to address these problems. Amongst his victims are thought to have been his wife, his mother-in-law, a brother, an illegitimate child, a mistress and, finally, a debtor.

His last victim, John Parsons Cook, died of a short illness characterised by episodes of vomiting and tetanic spasms, the latter occurring after the administration of medicines to which Palmer had access.

The investigation of Cook's death had some interesting features;

* The autopsy was done by a medical student.

* There appeared to have been interference with the viscera en route from the autopsy to Dr Taylor.

* There was interference with letters from Dr. Taylor to the Coroner.

* Palmer attempted to suborn the coroner.

* The toxicology analyses showed no significant positive findings. In particular, no strychnine was found in Cook's viscera.

* An Act of Parliament was passed, the Trial of Offences Act 1856, to allow Palmer to be tried at the Old Bailey in London rather than before a prejudiced Staffordshire jury.

* Journalists used subterfuge to obtain interviews with Dr. Taylor, the information obtained being used in his cross examination.

Despite all this, Palmer was found guilty and sentenced to death.

In my presentation of this case I will highlight the lessons of special relevance to those giving expert evidence to contemporary Courts.

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Covert Video Surveillance of Munchausen Syndrome by Proxy

Beatrice Yorker, JD, RN, MS, FAAN

Dean, College of Health and Human Services California State University, Los Angeles

Hospitals in the United States, Britain, Australia, and Canada have used covert video surveillance (CVS) in hospitals as a means of documenting Munchausen syndrome by Proxy, or fabrication of symptoms in children. Hall, Eubanks, Meyazhagan, et al. (2000) published a study evaluating the use of covert video surveillance in diagnosing Munchausen Syndrome by Proxy (MSBP). They concluded that the standard of care in pediatrics should include the capability of CVS as a diagnostic tool.

This session will review the Fourth Amendment and Title III as they relate to the right to privacy and this form of evidence collection. The current controversy surrounding MSBP has caused the profession of child protection to change

strategies and diagnostic labels in order to intervene in these cases. Strategies for addressing the backlash and ethical issues will be discussed.

Actual footage of covert video surveillance will be shown, with discussion of best practices for implementing CVS in a hospital setting. Use of video footage for confrontation, evidence in court, and then ultimately in follow up therapy with the perpetrator will be discussed. Other forms of evidence collection, such as toxicology, eye witness accounts, and indirect evidence such as improvement of the child's condition upon separation from the primary caregiver will be reviewed.

The presenter is a psychiatric nurse and an attorney who has testified in several complex cases including termination of parental rights involving video taped footage of injection of fecal material into a child's intravenous line, and cases in which there was no video tape footage, but direct and circumstantial evidence resulted in successful child protection. Her expert testimony was upheld on appeal by the Supreme Court of Georgia *In the Interest of C.M. and M.M., Children*. 236 Ga. App. 874, 513 S.E. 2d 773 (1999).

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Hall, D. E., Eubanks, L., Meyazhagan, S., Kenney, R. D., Johnson, S. C. (2000) Evaluation of covert video surveillance in the diagnosis of Munchausen Syndrome by Proxy: Lessons from 41 Cases. *Pediatrics* 105(6):1305-1312.

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"Mad, Bad and Dangerous to Know": Health Care Professionals Who Murder Their Patients.

A Robert W Forrest

Consultant in Clinical Chemistry & Forensic Toxicology, Sheffield teaching Hospitals Foundation NHS Trust & Professor of Forensic Chemistry University of Sheffield

Beatrice Yorker, JD, RN, MS, FAAN

The presenters, a physician and nurse from the United States and United Kingdom, both with law degrees in addition to their professional qualifications, will present, and draw conclusions from, a number of cases from their respective countries where health care professionals have been prosecuted for the murder of patients in their care.

These cases are relatively uncommon, at least in comparison to other types of homicide. However, one concern is that in most detected cases, a number of deaths occur before suspicions are aroused. The typical case involves an increased number of cardiopulmonary arrests on a particular

unit that are ultimately linked to presence of a specific nurse or healthcare provider.

The investigation of such cases can be very resource intensive and the high intelligence of the suspects makes careful planning of their interview mandatory. Downstream monitoring of the interview by an appropriate healthcare professional can be invaluable as can the incorporation into the investigative team of police officers with nursing or other healthcare qualifications.

The defense will usually be competent and well funded; extra-curial factors, whether or not introduced deliberately by the defense, will have to be anticipated by the prosecution team.

Video footage of some of the convicted nurses will be provided. Many perpetrators have a history of academic and disciplinary problems either as students or at earlier stages in their career. A more pro-active approach to students and practitioners with such problems, with career long monitoring of those who remain in a healthcare profession may be justified.

Such individuals are rarely mad, often bad (sociopathic), and may claim to be driven by idealism. For patients they are always dangerous to know.

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Fire Debris Analysis - A Brief Retrospection

Boyd E. Lasater, F-ABC

California Department of Justice - Sacramento Laboratory

This presentation is a brief retrospection of some of the methods used in the discipline of fire debris analysis. It is intended to be at an introductory level; therefore no prior arson tendencies are required.

The starting point of this overview will be the separation technique of steam distillation. The resulting sample was characterized by certain physical properties such as flash point, specific gravity, and refractive index. From this starting point, technical advances in both the separation techniques and analytical procedures will be introduced, culminating in the current carbon strip methods of extraction and gas chromatography/mass spectrometry ion profiling analysis.

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An Introduction to the Ignitable Liquids Reference Collection and Database

Bradley D. Cooper

Bureau of Alcohol, Tobacco, Firearms and Explosives

The Ignitable Liquids Reference Collection and Database is administered by the National Center for Forensic Science and is available to fire debris chemists nationwide to assist them in the identification of ignitable liquid residues. The National Center for Forensic Science provides research, education, training and other resources to the forensic science and criminal justice communities. The NCFS is a National Institute of Justice program that is hosted by the University of Central Florida. The database is available online while ignitable liquid standards from the reference collection may be purchased for a nominal fee. The presentation will discuss the Ignitable Liquids Reference Collection and Database as an available resource to fire debris chemists.

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"Do My Eyes Deceive Me" The Psychology of Crime Scene Assessment and Interpretation.

Callum Sutherland

Det Sgt Metropolitan Police, Council Member Forensic Science Society

It is widely recognised in criminal investigation that the forensic science process often begins at a crime scene itself. However, prior to the collection of physical evidence it is of the utmost importance that the detective investigator, crime scene manager and or scientist, where appropriate, determine how the physical evidence was created and in doing so reconstructs how the crime scene came to exist.

Crime scene interpretation and assessment is largely based on experience, logic and an understanding of our world of crime as we see it. If a crime scene is misdiagnosed at the outset, the scene examination and criminal investigation that follows is at risk. Crime scene assessment, interpretation and reconstruction are an on going process throughout an enquiry and must be completed in an organised, methodical, systematic and logical manner. It involves perception and our ability to correctly analyse what we see and in turn develop and gather the correct information and intelligence from the scene itself.

When coupled with a systematic study of related information such as scientific scene analysis, interpretation of scene pattern evidence, laboratory examination of physical evidence and a systematic study of related information, scene assessment and interpretation will assist in the formulation of a crime scene theory based on logic. When undertaken in a rigorous, objective and professional manner, crime scene assessment will be highly influential on the development of subsequent effective major lines of enquiry.

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Part 1: Bullet Holes in Wood: What Can be Determined from Them

Part 2: The Lincoln Target Board

*Lucien C. Haag
Forensic Science Services*

In August of 1863 Christopher Spencer had a private meeting with President Abraham Lincoln where he presented his revolutionary 7-shot repeating rifle to the President. The next day Lincoln fired a full magazine at an improvised target fashioned from a pine board. The board was placed against a tree in an area near the present-day Washington Monument. Lincoln was so impressed with the Spencer that he personally endorsing it and set aside General Ripley's opposition to the purchase of repeating cartridge guns for the Union Army. The Spencer rifles and carbines became the most dreaded and hated gun by the Confederates who fought the entire war with single shot muzzle-loading rifles and muskets. Spencer retained the target board for many years then sent it to the State of Illinois where it purportedly was lost in the mist of time.

The Lincoln Target Board has been found and the author was allowed to personally examine and photograph it at the Illinois State Military Museum in his home town of Springfield, Illinois.

The Lincoln Target Board allows us to see what sort of marksman our 16th president was but the bullet holes in the board raise some question as to just what version of the Spencer rifle President Lincoln fired on that historic and fateful day in August 1863.

Part 1 of this presentation will first illustrate the various things that can be determined from bullet holes in wood e.g., approximate caliber, direction of fire, bullet composition and impact velocity. Part 2 will provide a brief history of the Spence rifles and carbines, the various types of ammunition for these firearms, multiple views of the Lincoln Target Board and what can be reasonably concluded from the dimensions of the bullet holes in this most famous of all targets.

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Elemental Variation in Float Glass

*Abbegayle J. Dodds (Presenting author)
Sacramento County District Attorney's Laboratory of Forensic Services; Edward M. "Chip" Pollock
Sacramento County District Attorney's Laboratory of Forensic Services; Donald P. Land, UC Davis Dept of Chemistry & Grad Group in Forensic Science*

Elemental analysis is a highly discriminating technique for the forensic analysis of glass samples. However, the significance of finding that two glass fragments are similar or dissimilar in elemental composition is difficult to assign since the potential for compositional variation has not been evaluated for common glass end-products. We investigated the natural variation in batches of float glass and automotive windshield float glass.

We used LA-ICP-MS to analyze manufacturer-quality control samples from two float glass furnaces in California. These quality control samples represented the glass produced by each manufacturer for one month in various years of production (1997, 2004 and 2005). From these analyses, we observed the potential for compositional variation between the left, center and right portions of the float glass ribbon. Additionally, one manufacturer exhibited variation in less than 24 hours of production. The other manufacturer did not exhibit such short-term variations; this float glass product was consistent in composition for a period of at least 72 hours. Both manufacturers' product exhibited variation over one months' time. The potential for short- and long-term variations in float glass production may result in sample heterogeneity or the ability to discriminate between samples manufactured in the same production lot.

To determine what effect the variation due to manufacture might have on a specific glass end product we collected and analyzed a total of 50 windshields by LA-ICP-MS. Compositional variation was examined at three levels: (1) within-pane variation, (2) between-pane variation, and (3) population variation. Ten windshields were used to determine within-pane variation and between-pane variation; all 50 windshields were used to evaluate compositional variation in a population of windshields. We found that windshields exhibit some heterogeneity that is not always statistically significant. Usually, these variations were within 10% of the mean value when elemental concentrations were greater than 1 µg g⁻¹. Most of the windshields examined were composed of two significantly different panes of glass; however, certain manufacturers produced windshields using panes of glass produced from the same batch. The population variation in this group of 50 windshields was such that a preliminary grouping method resulted in twenty groups of indistinguishable panes of glass. Each group contained panes of glass produced in the same manufacturing lot; however, inner and outer panes of whole windshields were often distinguishable.

The results of this study show that the task of assigning significance to similar or dissimilar elemental profiles for questioned and reference glass fragments is not simple since elemental composition is not a unique characteristic and there is the potential of encountering heterogeneous float glass products in the forensic context.

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Phosphine Generation from Clandestine Methamphetamine Laboratory Waste

Rochelle A Hranac

Forensic Science Graduate Student, University of California, Davis

The number of methamphetamine labs has increased over the last twenty years. With this increasing number, the knowledge of what chemicals that were used is a must. The most popular urban method of manufacturing methamphetamine is the red phosphorus/iodine method. This method is capable of producing very toxic gases such as hydrochloric acid gas, hydriodic gas, and phosphine gas. Current cleaning methods rely on the presence of methamphetamine in a lab cook area, where as the other materials, like the iodine or red phosphorus, needed to manufacture methamphetamine may still be present in the area. This small lab-scale study was designed to test amorphous red phosphorus for the creation of phosphine (PH₃) gas. These results can inform officials what else can be present in a meth lab and perhaps alter the cleaning requirements for meth labs. The study subjects red phosphorus to four different relative humidity levels at four different temperatures and also to three metal oxides that the red phosphorus may come in contact with at a methamphetamine lab cook. These temperatures were 40, 30, 25, and 20°C with humidity levels from 20% to 80%. The three metal oxides were copper (I) oxide, iron (III) oxide, and aluminum oxide. After the uncontaminated red phosphorus was tested, waste red phosphorus was subjected to the resulting ideal conditions for phosphine to form. Due to some security concerns, the waste red phosphorus had no methamphetamine contamination. The red phosphorus was mixed with hydriodic acid and water, which is part of methamphetamine production. All that was missing was the ephedrine/pseudoephedrine from the mixture.

From preliminary results the 40°C 80% samples produced the most PH₃ at twice the relative abundance of the 5% SF₆ internal standard. The 20°C 20% samples gave the least amount of PH₃ at one-third the relative abundance of the 5% SF₆ internal standard. The higher and more humid samples were expected to produce the most phosphine, but this study will give numbers on how much phosphine can be produced. Unfortunately, the metals oxide samples did not give results as expected. Most samples did not give a detectable peak of phosphine.

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Now and Then - A Biologist's Perspective 40 Years On

Dr Ann Priston, OBE, JP

Vice President, The Forensic Science Society, UK

Forty years ago guilty men walked free from justice because of lack of evidence. The last four decades have seen some of the most dramatic changes in the history of forensic examinations. Advances, not only in DNA but also in other branches of science, technology and policing have meant that

many old cases can be revisited and offenders brought before the courts. The extreme sensitivity of DNA analysis by LCN has brought about dramatic changes in crime scene and laboratory practices and even criminal behaviour. Evidence presentation has changed along with court procedures which have reduced the time taken for cases to come to court. This paper takes a brief look at practices forty years ago and compares them with current methods, using cases examples as illustrations.

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TASER-Related Deaths

Brian Peterson, M.D.

Of the few truly controversial issues confronting modern forensic pathology, TASER-related deaths surely ranks near the top of the list. Somewhere in the intersection of drug use trends, restraint and control techniques, the aftermath of the Rodney King trials and the concept of "living better electrically" lurks the truth. But where? We will review drug effects, focusing on methamphetamine, cocaine and PCP. Following a detour through the world of excited delirium, we will focus on energy weapons and their effects, including the TASER. Finally, an approach will be suggested with respect to the analysis and disposition of in-custody, TASER-related deaths. Prepare to be shocked!

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Serial Sexual Assaulting Twins - Which One Did It?

Shannon Cavness and Vince Deitchman

Oakland Police Department Crime Lab

This series of cases involves female victims and a pair of identical twins. Current methodologies of forensic DNA analyses do not allow us to distinguish identical twins. This particular series of cases highlights several things: common sense can answer many questions, DNA is not the answer for everything, fingerprints can differentiate identical twins and the marriage of forensic disciplines is very beneficial for the community.

In June of 2005, the Alameda County District Attorney's Office requested a sexual assault kit from 2004 be examined. The sperm fraction of the vaginal swab was entered into CODIS. This particular case had a known suspect from which a suspect sexual assault kit had been collected. The victim's DNA type was found on the swab of the suspect's penis and the suspect's DNA type was found on the victim's vaginal swab. This information was reported to the District Attorney's Office. Subsequently, we were informed that the suspect had a twin. Whether the twin was identical was unknown.

Hmmm, I wonder which twin was responsible for this one.

In September of 2005 the 2004 case hit to an unsolved

Oakland sexual assault case from 1995 in LDIS. The 1995 case was analyzed in 2001 using grant money from the OCJP Cold Hit Program. Unfortunately this assailant has a twin. It is unknown which of the twins was responsible for the 1995 sexual assault. In this series of cases there is no good twin/bad twin dichotomy - just bad twins and neither of them were incarcerated at the time of the sexual assault. The assailant deposited a fingerprint on a Heineken beer bottle. Heineken beer bottles make great repositories for fingerprints. This fingerprint enabled us to place the responsible twin at the scene of the rape in 1995.

Hmmm, I wonder which twin was responsible for this one.

Again grant money, this time from the NIJ, Backlog Reduction grant, enabled us to perform DNA typing on numerous sexual assault kits. The sperm fraction of the vaginal swab from a 2003 case was entered into CODIS. The profile hit to both the 2004 and 1995 cases in LDIS. Unfortunately this convicted offender had a twin (an identical twin). Sound familiar?

This paper will discuss the cases and how the laboratory aided in the identification of the perpetrator. Luckily we had good investigative work, strong witnesses, an intelligent jury and a hard-working district attorney team to convict the twin responsible.

All of the answers will be divulged at the meeting...

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Walk on the Wild Side: Animal DNA Analysis in Criminal Investigations

Elizabeth Wictum

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The molecular analysis of human biological material has become widely accepted and a boon to forensic science. However, the use of animal DNA in crime scene investigations is largely underutilized. Once considered a curiosity, animal DNA evidence is receiving increased recognition and acceptance by law enforcement officers and the courts. There are an estimated 65 million pet dogs and 78 million pet cats in the United States. The close relationship between pets and their owners provides for abundant biological material and the potential for evidence transfer in the form of hair, saliva, urine, feces, and blood. Due to the grooming habits of cats and dogs, animal hairs can sometimes yield a DNA profile when human hairs would not. Animal DNA results have been used to link a perpetrator to a crime scene or victim in instances of homicide, burglary, arson, and sexual assault. In instances where the animal is the victim, we have used DNA to establish a pattern of abuse or to link a weapon to an individual animal. When the animal has been the aggressor, we have used DNA to illustrate the manner of the attack. Here we present an overview of cases where animal crime scene evidence was used to charge and prosecute those responsible.

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Field Reagents for Blood Enhancement

Jason Kwast

Contra Costa County Office of the Sheriff Crime Lab

The field reagents used at our lab to enhance prints in blood will be discussed and compared. A few casework examples using leucocrystal violet, diaminobenzidine, and amido black will be shown. A limited number of common substances were tested using the reagents to assess specificity. The reagents' sensitivity with blood was also tested. The specificity and sensitivity results will be presented.

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Shooting Reconstruction: The Value of Evidence & Analysis

Alexander Jason SCSA, CFPH

Independent Analyst

A double homicide occurred; the primary issue: was this a deliberate homicide or multiple acts of self-defense? The physical evidence, while substantial in quantity, was initially regarded to be of insignificant value in answering the key question.

This paper demonstrates the methodology involved in a multi-disciplinary approach to the reconstruction and analysis of a shooting incident in which bloodspatter, bullet impact damage, cartridge case locations, victim wound path evidence from the autopsy, and other elements are all integrated into an analysis which can be used to determine significant facts. These facts can then be utilized to determine what could and could not have occurred and specifically, which version - if any - of the incident is consistent with the physical evidence. Although a shooting incident reconstruction always includes the forensic crime laboratory analysis of the physical evidence, an effective reconstruction requires an understanding of the capabilities and dynamic characteristics of firearms, projectiles, ejected cartridge cases, gunshot residue and the dynamics involved in the production and projection of bloodspatter from gunshot wounds. A chemical test of physical evidence items provided confirmation of damage caused by bullets which contributed to the overall reconstruction and is an important tool in shooting reconstruction.

This case is an excellent example of how all these items can be integrated into an analysis and reconstruction. An ad-

ditional important component in the overall reconstruction is the use of 3D computer animation modeling and the graphic enhancement of crime scene photographs. While both were used during the trial in the form of demonstrative exhibits, they were also used in the actual analysis and reconstruction. The detailed and scaled 3D computer model of the house in which the shootings occurred allowed the crime scene to be rotated and viewed at many perspectives which was very helpful in determining both possible bullet trajectories and the trajectories of ejected cartridge cases. This paper will discuss the crime, the methods of the analysis, and the reconstruction.

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Evaluation of Zeolite and Chitosan as Substrates for Collection and Storage of DNA

*Steven B. Lee
Forensic Science Program, Justice Studies Department, San Jose State University*

There have been two developments in the field of battlefield medicine, consisting of hemostatic agents made of unique materials. One of these is the QuikClot(r) hemostatic agent, made of zeolite, a silicate made from equal parts silicon tetroxide (SiO₄) and aluminum tetroxide (AlO₄). The other is the HemCon(r) hemostatic agent, made from chitosan, a starch found in the shells of shrimp. These bandages have already been deployed to armed forces and law enforcement agencies.

The mechanisms of hemostasis by the two agents differ, in that QuikClot(r) adsorbs the liquid from the blood, which is an exothermic reaction. The HemCon(r) agent uses the positive electrical charge of the chitosan molecules to attract the red blood cells to it, forming a clot in an extremely short time period, stopping profuse bleeding and allowing the body's natural healing processes to take hold.

This study has been initiated to determine the efficacy of recovery of DNA from blood bound in these two unique substrates. There are 4 areas of interest in this study:

1. Recovery of "naked" DNA after introducing it to the substrates.
2. Recovery of DNA from blood samples (whole blood) immediately following deposition onto the substrates.
3. Recovery of DNA following storage of blood on the substrates at -30 C freezer for periods of 1 month to 1 year.
4. Recovery of DNA following storage of blood on the substrates at room temperature for periods of 1 month to 1 year.

These last two areas of interest are to determine the efficacy of using such materials for storage of blood samples for DNA recovery that may be useful for DNA databases.

It is felt the application of this study has potential for demonstrating a new method of recovering blood at crime scenes for later analysis which would reduce the possibility of exposure to blood borne pathogens by crime scene and law enforcement personnel. Additionally, there is the potential

of using these agents as a means for obtaining DNA samples of suspects, who might use such products in an attempt to "self-treat" wounds received in violent encounters with law enforcement officers in order to avoid situations where the suspects put themselves at risk for detection and arrest, i.e., arriving at a hospital emergency room, seeking treatment for gunshot wounds. Furthermore, recovery of DNA from the used bandages may be useful for military investigations as both QC and HC have already been deployed to US armed forces.

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Adv. in Forensic Paint Examinations (Mon 10/9)

Instructor: Scott Ryland, FDLE/DNA (Tue 10/10): TBA

Breath Alcohol (Mon 10/9)

Instructors: Rod Gullberg, WA State Patrol & Greg Priebe, Cal DOJ

Technical Writing (Mon & Tue 10/9-10)

Instructor: Ann Neumann, MA, JD

Forensic Soils Examinations (Tue 10/10)

Instructors: Dr. Raymond Murray, For. Geologist; Skip Palenik, Microtrace;
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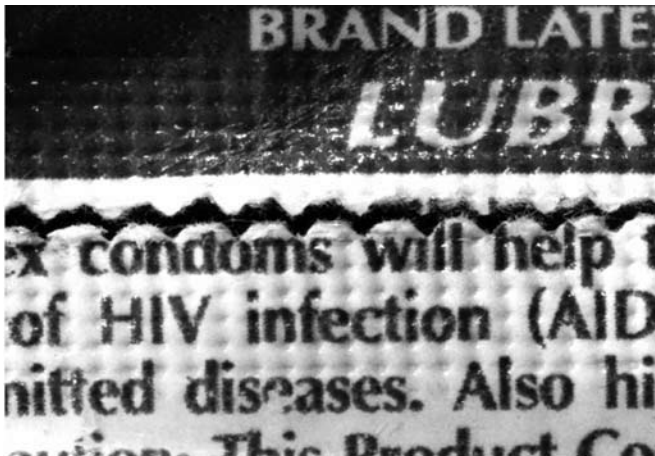
Condom Wrappers Link Subject to Sexual Assault

by Mr. Chris Taylor, Trace Evidence Branch
Reprinted from the US ARMY Criminal Investigation Laboratory Bulletin, Issue I March 2006

When a condom wrapper is found at a crime scene, the agent knows that it needs to be collected for fingerprints, a potential lubricant standard or possibly even for DNA. What some investigators might not realize is a simple physical fit of a used condom wrapper to a condom wrapper in the possession of the subject can associate him with the victim and/or crime scene(s). More commonly during a sexual assault, a condom wrapper may be left at the scene or discovered in the trash at the victim's residence. Because these wrappers are typically connected together in a series, upon separation of a single condom packet from its source, the wrapper can be examined at the perforations(s) or tear(s) to establish a physical fit.

Examination of condom wrappers from several manufacturing sources has revealed the sides of the wrappers shift slightly, top to bottom and side to side when being sealed around prophylactics during production. When the perforation is stamped into and between each prophylactic the serrated perforations varies from wrapper to wrapper. This allows sufficient variability to disclose a physical fit of the separation and the off set patterns in the printing to conclude the wrappers were once a single component.

This is demonstrated in the photos provided. Several cases at the USACIL have been successful in establishing a common link between the subject and scene through the examination of condom wrappers. Upon recovering a condom wrapper from the scene, the investigator should be aware that the subject may be in possession of a critical piece of evidence that would link him to the crime.



In this case, three condoms were used during the assault. Three wrappers were left and recovered near the scene. The three wrappers physically fit each other and ultimately fit a condom wrapper from the subject's top dresser drawer.

Close up of the physical fit of one wrapper from the scene to the wrapper in the subject's dresser (Note the "i" and "ll" in "will" and the "h" and "l" in "help" and how the letters fit together across the separation).

And a Bit of Commentary: Quiz Question for Bayesian Bozos

On page 5 of the March 2006 issue of the *USACIL Bulletin* (reprinted at left), Chris Taylor, a criminalist at the U.S. Army Criminal Investigation Laboratory, showed how empty condom packets recovered from the scene of a sexual assault could be shown by fracture match to have once been connected to each other and also to an unused condom packet in the possession of a suspect.

However, I tell my forensic science students that they should try to think like a defense attorney. So, putting my black hat on, I opine that "Just because one can show a perfect fracture match between one perforated condom packet and the perforated edge on another (separate) condom packet, doesn't necessarily show that they both originated from the same box of condoms. One could be the first or last of a series that was placed in one box and the other could be the first or last of a series that was placed in either the preceding or succeeding box on the assembly line."

Okay, I realize that Chris Taylor's case isn't the same. But even if the three empty condom packets found at the scene can be shown to have once been contiguous and if a perforated edge on one of these matches one end a contiguous line of 9 condoms from an original box labeled to hold 12, it could still just be a lucky coincidence and the three from the scene could have come from a separate box.

Of course, all the condoms in question have to be the same brand and all have to have the same lot number. [The lot number and an expiration date are marked on each packet.] Do the total number of condoms produced in that particular lot have an effect on any probability calculation? I dunno; I was daydreaming about co-eds when statistics were covered in class. I do know that it is possible to find out from the manufacturer how many condoms were produced in a given lot. Last year I was involved in a case where an empty condom wrapper was found at the scene. The manufacturer was able to tell me that 1417 x 144 condoms were produced in that lot [I'd insert a joke here about gross ignorance, but I've already picked on ASCLD-Lab Inspectors too much].

So, what do Bayesian statistics have to say about the likelihood that an empty condom packet found at the scene of a sexual assault and found to be a fracture match with one end of condom packets in the possession of a suspect did or did not originally come from the same box? Does it matter whether it was a box of 3, 6, 9, or 12? [For innocents out there, you can assume that all of the condoms packets in a given box are contiguously connected.]

Bob Blackledge

The Daubert Worldview

Prolegomenon: A Pronunciation Gazetteer

Q: Before we get to what it all means, how is "Daubert" pronounced?

A: "Dow-burt."

Q: How do you know?

A: From an article authored by a duly licensed attorney who developed his opinion in the regular course of his professional duties. See Michael H. Gottesman, Admissibility of Expert Testimony After Daubert: The "Prestige" Factor, 43 Emory L.J. 867, 867 (1994).

Q: What makes Gottesman an expert on this subject?

A: He represented Jason Daubert before the Supreme Court and listened to how the Daubert family pronounced the name.

Q: So Gottesman's opinion on the correct pronunciation was developed for litigation purposes?

A: Yes.

Q: Is "dow-burt" the generally accepted pronunciation?

A: Not universally so. Many lawyers and judges say "dough-bear."

Q: Well, what about the methods Gottesman used to arrive at his conclusion? Is listening to the client a prevalent methodology in the legal field?

A: To a point.

Q: So did Gottesman take any courses on listening to the client during law school?

A: Almost certainly not.

Q: Has the technique of listening to the client been tested?

A: Informally.

Q: Does it have a known error rate?

A: The error rate is thought to be fairly high.

Q: Isn't it true, in fact, that Jason Daubert himself says the correct pronunciation is "daw-burt"?

A: Yes, but that's a single anecdotal report from somebody who doesn't even have a law degree. Gottesman's views are reflected in the published literature and have survived the crucible of peer review.

Q: Has Gottesman been consistent, at least, in the position he has taken on the proper pronunciation?

A: No. When he was arguing the case before the Supreme Court, he pronounced the name "dough-bear."

Q: Why?

A: The Justices seemed to prefer that pronunciation.

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