The CACNews

News of the California Association of Criminalists • Third Quarter 1999

HIRAM **EVANS**

The Retrospective and the Traditional

It is my first task as President to thank the members of the 1998-1999 Board of Directors for their work; particular credit must go to **Ron Nichols**, now past president, for directing the activities of the board; **Carolyn Gannett** for the follow-up work which is the province of past presidents; **Ray Davis**, retiring editorial secretary, for his consistent improvement of the *CACNews;* retiring Treasurer **Michael Parigian** for tracking and management of the now significant financial resources of the Association; and retiring Regional Director-North **Joe Hourigan** for continuance of the multiplicity of study groups which are the most basic work of the Association.

For those of you looking for wise words regarding criminalistics in the new Millennium, I give fair warning that I am one of those curmudgeons who believe it begins in 2001. After all, Arthur C. Clarke didn't call his novel "*2000—A Space Odyssey.*" Therefore I shall defer prospective words of wisdom to my successor and content myself with the retrospective and the traditional.

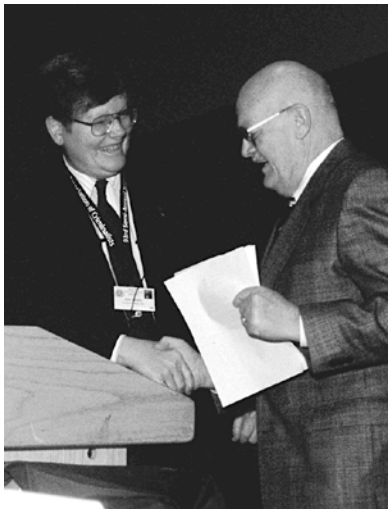
It is traditional for the incoming president to set forth a plan or theme for the ensuing term. In words, my plan is straightforward. One, the reinvigoration of the committees, through which so much of the work of the Association is conducted and where the association can use YOUR participation, which I solicit. Second, the reassertion of the position of California Association of Criminalists as a leader in forensic science through myriad roles in setting standards in and for the profession. Through participation in technical/scientific working groups (TWGs / SWGs), ASTM, the American Board of Criminalistics, and ASCLD/LAB, CAC members can significantly affect the profession. The collective knowledge and experience of this Association can be brought to bear in proposing these standards. Only through information exchange between this Association's members and similar exchanges within other regional forensic science associations, should standards be set. I am convinced that the regional associations are the best barometer of the practice of the profession. While it is undoubtedly handy to have funding from national organizations, I remain unconvinced that practice and procedure within a few national laboratories reflect reality for the bulk of forensic practitioners.

I remain unconvinced that practice and procedure within a few national laboratories reflect reality for most forensic practitioners.

The American Chemical Society calls chemistry the "central science;" criminalistics is similarly the central forensic science and the California Association of Criminalists its archetypal organization of criminalists. Join me in building the Association and actively participating in YOUR profession.

Third Quarter 1999

C O N T E N T S



On the cover: John De Haan welcomes Tony Longhetti to the podium in anticipation of his CAC Founder's Lecture at the Spring 99 seminar.

The CACNews

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NOTICE: The use of the CAC logo is restricted to official communications and by other authorization of the CAC Board.

Northern Section Report Firearms Study Group Meeting

The Northern California Firearms Study Group was hosted by the Sacramento District Attorney's Laboratory of Forensic Services on March 18, 1999. The theme centered on firearms evidence, courtroom presentation and expert witness testimony.

Guest speaker Deputy District Attorney Brian Myers demonstrated the use of the Department's current computer technology in the preparation of court displays using digital imaging techniques, presentation of photographs, documents and physical evidence using digital overhead projectors. Integration of PowerPoint, video and digital overhead projection as a multi-media presentation was also demonstrated to the group.

Bruce Moran discussed his philosophy and approach to forensic firearms expert witness testimony. His presentation included the importance of a pre-trial conference, use of curriculum vitaes, use of routine diagrams to supplement the verbal explanation of terms and concepts often presented in forensic examination, techniques for preparing quick and easy to make court displays and his views on criteria for identification.

The meeting was well attended by members of government and private laboratories in the Bay Area and the central part of the state.

Stuff seen on the //WWWEB

1999 Forensic Toxicology Seminar The Effects Of Alcohol & Drugs On Human Performance & Behavior

Sponsored by the New York State Division of Criminal Justice Services, the New York State Police and the Northeastern Association of Forensic Scientists. (Conference is supported in part by Grant No. 96-DB-MU-0036 awarded by the Office of Justice Programs, U.S. Department of Justice)

The New York State Division of Criminal Justice Services, along with the New York State Police and the Northeastern Association of Forensic Scientists, is pleased to announce a summer toxicology seminar on the influence of drug and alcohol. The seminar will bring together renowned speakers, as well as toxicologists from throughout the United States and Canada. It will be held July 20-23 at the New York State Police Academy in Albany, New York.

Pre-registration rates are valid until June 30, 1999. No registrations will be accepted after July 9, 1999. Cancellations must be made in writing; no refunds will be granted after June 30, 1999.

CONTACT: Jennifer Limoges NYSP Forensic Investigation Center 1220 Washington Ave., Bldg. 30 Albany, NY 12226-3000 Phone: 518-457-1208 Fax: 518-457-2477 E-mail: jimoges@troopers.state.ny.us

News from all over

The DAB used the TWGDAM (now SWGDAM) guidelines as the stating point for the current guidelines. There is a new web site just for the SWG it can be found at http://www.for-swg.org this will be a site used to communicate the work done by the SWG groups.

THANKS TO THE FBI for the new on-line journal Forensic Science Communications (http://www.fbi.gov/lab/fsc/tocapr99.htm). The *Crime Lab Digest* will no longer be printed it is being replaced by the "Forensic Science Communications" the on-line peer reviewed journal.

Forensic Scientist Position Available

The Northern Illinois Police Crime Laboratory, Highland Park, Illinois has an opening for forensic scientist. The position will remain open until filled.

Duties include analyzing and identifying controlled substances using analytical techniques such as chemical spot tests, microscopic tests, Fourier Transform Infrared Spectrophotometry and Gas Chromatography/Mass Spectrometry. Perform toxicological examinations of biological fluids for the presence of ethyl alcohol and drugs of abuse. Examine fire debris for ignitable liquid. Qualifications: Bachelor's degree in a natural science or criminalistics. In addition, a Masters's of Science in a natural science or criminalistics is highly desirable.

Send a resume and cover letter to: Reena Roy, Ph.D. Executive Director Northern Illinois Police Crime Laboratory 1677 Old Deerfield Road, Highland Park, Illinois 60035 Fax (847) 432-5199.

Ed Jones' Face Game

Instrumental Pioneers

Match the inventor to the instrument bearing his name:Perkin, Elmer, Finnigan, Beckman, Hewlett and Packard.

Ans. in back.

Jobs • Meetings • Courses

Recruitment Planned

San Bernardino County Sheriff, Scientific Investigations Division will soon be recruiting for Forensic Specialists ($25,190-$40,066), Forensic Laboratory Technicians ($25,834-$42,042) and Criminalists ($40,082-$60,710). Forensic Specialists log and store evidence, conduct fingerprint comparisons and perform crime scene investigations. Forensic Laboratory Technicians process evidence, analyze exhibits for controlled substances and perform alcohol analyses. Criminalists analyze physical evidence and may conduct field investigations at scenes of illicit drug labs. Letters of interest may be sent to: Philip M. Kellett, Sheriff's Scientific Investigations Division, 200 S. Lena Road, San Bernardino, CA 92415-0056.

Supervising Criminalist

$5225-6354 Monthly
Open Continuous
County Government Center, Department of Human Resources, Lower Level, East Wing, 70 West Hedding Street, San Jose CA 95110 (408) 299-2341.

The application filing period may be closed at any time after ten days from the issue date of this bulletin if sufficient qualified applications have been received. Therefore, it is important to submit your application as soon as possible.

Under direction, to supervise and coordinate activities and staff in the DA's Crime Lab.; to participate in the casework of the section assigned.

This class is responsible for day-to-day supervision of criminalist and toxicologist staff in the Crime Lab. This class is distinguished from the Criminalist III/ Toxicologist III which is the journey level class assigned complex analysis, and from the Assistant Crime Lab Director class which has managerial and oversight responsibilities for the entire Crime Laboratory.

Duties: Manages, directs, and supervises the day-to-day activities within a unit of the Crime Laboratory; develops and implements laboratory systems, procedures, and techniques; conducts research and experimentation to develop and improve analytical methods and procedures; prepares statistical reports of work performed, consults and advises law enforcement officers, probation officers, and attorneys regarding nature of evidence, laboratory analysis and interpretation; interprets findings for the courts and other legal hearings; writes reports and standard operating procedures outlining methods and results; ensures proper compliance and reporting with regulatory agencies; reviews potential cases and examines case notes of completed cases to ensure quality control, ability to support conclusions, and evaluate staff performance; trains staff in procedures and techniques of forensic science, assist in the more difficult and unusual evidence analysis; resolves administrative, agency liaison, and technical problems associated with analysis, instrumentation repair and maintenance, and procedures; performs other related work as required.

It is anticipated that successful applicants will have at least four years of full-time, progressively responsible professional work experience in a crime laboratory or a closely related scientific environment (including work experience in a lead or supervisory capacity.)

(The above job announcements were gathered from the internet and seminar flyers and have not been verified by the CACNews.*)*

SWGMAT Guidelines

The Technical Working Group for Materials Analysis (TWGMAT) has been renamed to the Scientific Working Group for Materials Analyis (SWGMAT). This is to reflect our basic nature of addressing the scientific, and not merely technical, issues regarding our discipline. This is true of the other Bureau- or DEA-sponsored SWGs, ne TWGs (SWGDAM, SWGDOC, SWGDRUG, etc.). The SWGMAT Forensic Fiber Examination Guidelines are now available through Forensic Science Communications, the online successor to Crime Laboratory Digest. Go to www.fbi.gov and look for Forensic Science Communications on the front page or go through "Science and Technology." The other guidelines (Trace Evidence Handling, Trace Evidence Quality Assurance, Forensic Paint Analysis and Comparison) will become available through this venue. Additional information on the SWGs is available at www.for-swg.org.

ICITAP Looking for Instructors, Equipment

The International Criminal Investigative Training Assistance Program (ICITAP) is looking for instructors to assist in programs overseas. Laboratories or departments willing to assist in the training of foriegn national criminalists and crime scene techs by providing 3 month internships, and laboratories and departments willing to donate equipment they are no longer using to forensic programs in project countries.

The Forensic Development Unit of (ICITAP) assists in the development and establishment of forensic programs in developing nation around the world. This is accomplished through a combination of on site training, internships and donation of equipment. Topics include an overview of forensic investigative techniques, basic crime scene processing, crime scene photography, latent finger prints, conventional serology, firearms and tool mark identification, trace analysis and forensic chemistry as well as on site evaluations and needs assessments. Contact the ICITAP Forensic Development Unit if you have a teaching and/or a language ability and would like to share your knowledge with your counterparts in our project countries.

Part of the Forensic Development Unit's training philosophy is to provide 3 month internships to selected individuals from our project countries. These internships provide more in-depth training in the subject area than can be provided in a one or two week training seminar. The internees then return to their countries and disseminate the information and training they obtained during their stay in the United States. We are currently looking for laboratories to host interns in: conventional serology, firearms and toolmarks, toxicology, fingerprint examinations, crime scene processing, crime scene photography, drug analysis, pathology and questioned documents.

ICITAP has a limited budget to meet the equipment to our project counties. Contact the ICITAP Forensic Development Unit if your laboratory has any type of equipment that it is no longer using and would be willing to donate.

Peter D. Barnett, Forensic Science Associates, Richmond, CA. http://www.fsalab.com

Donnell Christian, Forensic Coordinator, US Dept .of Justice (ICITAP).

202 305 4255 e-mail at donnell.christian@usdoj.gov

NANCY**MCCOMBS**

A Code of Social Conduct

As members of the CAC we are expected to abide by the fundamentals set forth in our *Code of Ethics.* These standards are intended as a guide for our ethical conduct in the field of criminalistics. Simply stated, they act as a guide for our conduct as it relates to scientific analysis, examination of physical evidence and its interpretation and presentation in court. Yet, what of our conduct at professional seminars?

It certainly does not violate CAC ethical guidelines to be discourteous. Because one lacks consideration, does not mean one lacks professional ethics. Yet, do we want our organization to be aligned with this boorish behavior? Unfortunately, this is how many individuals perceive us.

We like to refer to ourselves as a "professional" organization, yet this is often not reflected in our comportment at meetings. "Discussion" is now being replaced with "eruption", "communicate" with "retaliate" and "training" with "defaming." This type of behavior dissuades membership in our organization as well as participation at seminars.

Certainly, "hot topics" will arise to stimulate impassioned debate. However, aggressiveness, condescending remarks and rude interruptions should not be welcomed at seminars regardless of our personal opinions of one another, or our level of disagreement.

We are forced to dull our emotions when faced with horrific crime scenes. Are we now extending this tactic into a new arena? Are we becoming impervious to the feelings of others?

Our organization is a strong and reputable one. It is not the Jerry Springer show.

Our organization is a strong and reputable one. It is not the Jerry Springer Show. Seminars are intended to be a medium for exchanging information. Individuals should feel comfortable in doing so, without the fear of becoming victimized.

Perhaps we should consider a "code of social conduct." Its implementation, in conjunction with the ethical standards we uphold, would heighten the professionalism of our organization and raise the individual spirit.

* * *

On a lighter note, I would like to thank Raymond Davis, John Houde and members of the *CACNews* staff for providing our Association with a newsletter of which we can all be proud. Due to their commitment over the past four years, as well as the support of the membership, the *News* has evolved into the fine publication it is today. To fully appreciate the growth and refinement of our newsletter, I recommend glancing through some back issues. Both Raymond and John have been kind enough to provide me with the direction necessary to ensure a smooth transition. I am very honored to serve the CAC in this capacity and would greatly appreciate your support in the form of articles, ideas or suggestions.

Nancy

F E E D B A C K

Not Just a Box of Swabs

Editor:

As a criminalist in the Forensic Biology Unit of the Laboratory of Forensic Science Services in Sacramento, I examine physical evidence in many sexual assault cases. I often imagine how horrible it would be if I were the victim of a sexual assault. Virtually everyday I go to work, open a sexual assault kit, remove the contents and begin my analysis. Not a big deal, just another day in the lab and another box of swabs.

A startling thing happened to me the other day while waiting to testify that changed my life forever. While the court recessed for its afternoon break, I walked across the street to the DA's office. The Deputy District Attorney on the case happened to be standing in the front lobby with a nice looking girl in her early teens and an older woman. He said hello to me and said, "I would like you to meet (the name of the victim in the case) and her mother." He introduced me as "The criminalist who did the scientific analysis on the case." The young girl could not look me in the eye and with her head cast down said, "hello and thank you." At that moment I realized the evidence I handle is a big deal. I had never before associated myself with the victims. To me they were "just a box of swabs." A box containing white cotton tipped applicators and yellow stains. But they are not a box of swabs.

I tend to desensitize myself from evidence I handle in order to not think about what I am truly doing. This particular incident made me realize the impact we make. As criminalists, we affect people's lives by the conclusions we reach and the manner in which we represent them in court. Our scientific results may be responsible for imprisoning a person or exonerating him. Our part in the criminal justice system is to provide a voice for the evidence.

You may say what you'd like about how emotional this may sound. The truth, however, is the truth. I have been accused of being too passionate, overzealous and even dramatic. It is when we are not passionate about our work that we begin to stop caring about what we do. Both the victims and the accused deserve our best. If I am ever the victim of a sexual assault, I hope a passionate person will work on my case. I would not want to be considered "just a box of swabs."

– Jill Spriggs
Sacramento

Silencer Marks in the Absence of a Silencer: A Case Study

Abstract

This case involved the examination of bullets recovered from the body of a homicide victim. Examination of the bullets revealed the presence of shearing marks, which suggested a silencer was used.

Key Words: Silencer; Shearing Marks

Information concerning markings on bullets caused by silencers have been previously published in the AFTE Journal. Miller reported a case involving two silencers in which it was observed that one silencer sheared the bullets, resulting in identifiable striae, while another silencer caused a distinctive groove from the shoulder to the nose of the bullets (1). Miller also reported a case involving the examination and identification of bullets to a specific firearm and silencer combination (2).

The Laboratory became involved in the investigation of two homicides which were performed during the commission of two separate robberies. One of these involved the use of a firearm, which according to a witness, had a silencer attached to it at the time of firing. After a lengthy investigation, an arrest was made, but according to the suspect, the firearm was dismantled, the barrel broken off, and the pieces were subsequently discarded into the San Francisco Bay. Evidence originally recovered from the scene consisted of four expended Companhia Brasileira DeCartuchos (CBC) brand, caliber .25 AUTO cartridge casings and four fired caliber .25 AUTO bullets recovered from the body of the victim at autopsy. Several months prior to the arrest of the suspect, a no gun ID of the autopsy bullets revealed the suspect firearm to be one of several caliber .25 AUTO semi-automatic pistols, which included a Jennings / Bryco J25.

With the aid of the suspect, investigators recovered only the frame of the dismantled Jennings / Bryco brand, Model 25 / J25 semi-automatic pistol from the San Francisco Bay seven months after the murder took place. As such, no identification of the bullets recovered from the body of the victim could be performed. The suspect, who was an accomplished mechanic and machinist, provided a detailed description of the construction of the silencer to investigators during his confession of the two murders. The silencer was constructed of alternating steel washers and rubber baffles inserted into a piece of machined aluminum tubing approximately 8" long and 3 / 4" in diameter. For more information about silencer design, refer to the article by Hueske (3). Based on these plans, the Rangemaster of the San Mateo County Sheriff's Office was able to reconstruct the silencer for court display purposes (with appropriate ATF approval as well as California Department of Justice exemption for law enforcement personnel).

An identical Jennings brand, Model J25, caliber .25 AUTO semi-automatic pistol was procured from the Laboratory's Firearms Reference Collection for testfiring, with and without the constructed silencer. Testfires with the silencer attached revealed the consistent presence of shearing marks which were surprisingly similar to those observed on two of four of the autopsy bullets recovered from the victim. The suspect recanted his confession that he made and used the silencer (which weighted heavily towards pre-meditation of the robberies and subsequent homicides). The suspect's girlfriend testified that he had indeed constructed and used a silencer similar to that of the reconstructed silencer. The circumstantial evidence of the presence of silencer shearing marks in combination with her testimony was an integral part of the information that aided the jury in rendering a guilty verdict.

This Laboratory very rarely encounters firearms equipped with silencers. If fired bullets are recovered from a crime scene or victim and display consistency in damage, then the possibility of the use of a silencer or other accessory equipment should be considered.

Acknowledgment: I wish to thank Sgt. Mike Peck, Rangemaster of the San Mateo County Sheriff's Office, for his assistance in preparing this article.

1)Miller, Jerry, "Silencer Markings", AFTE Journal, Vol 26, No.4, October 1994, p. 292

2)Miller, Jerry, "Silencer Marks: A Case Study", AFTE Journal, Vol 28, No.4, October 1996, p. 247

3)Hueske, Edward E., "Silencers - A Review and Look At The State Of The Art", AFTE Journal, Vol 23, No. 2, April 1991, p. 668

Kenton S. Wong
San Mateo County Sheriff's Forensic Laboratory, 31 Tower Road, San Mateo, CA 94402-4097

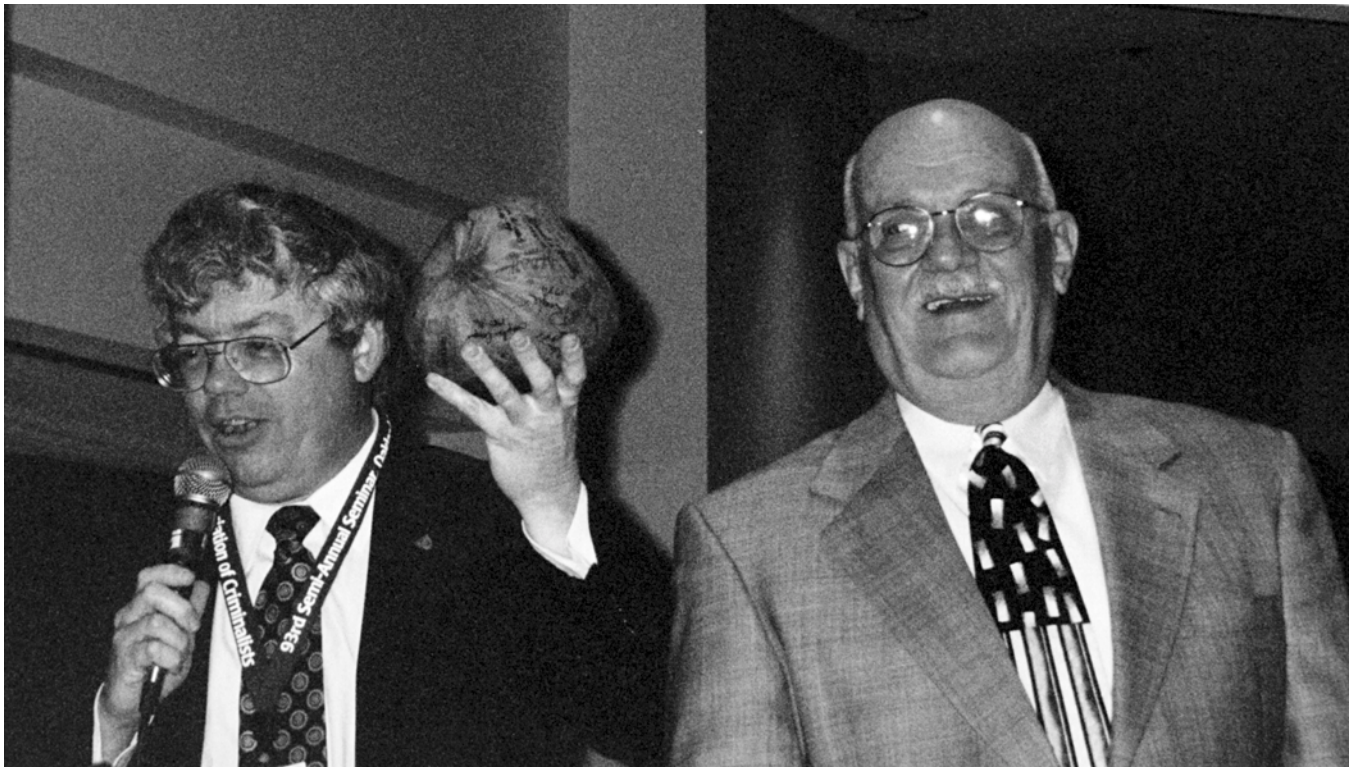
Financial Report
General Association Account
Account Balances, July 1, 1998 to March 31, 1999

Cash Balance July 1,1998			$49,546.57
INCOME			
	Interest	$1,018.55	
	Meetings	$-	
	Seminars	$17,610.03	
	Membership dues	$39,697.50	
	Membership applications	$3,420.00	
	Newsletter	$296.00	
	Advertising	$225.00	
	Endowment income	$-	
	Other	$-	
	(Seminar Visa Income Holding)		
	Total income	$62,267.08	$62,267.08
EXPENSES			
	Travel	$2,025.72	
	Printing	$11,890.26	
	Postage	$1,614.80	
	Supplies	$57.99	
	Bank fees	$815.11	
	Accounting service fees	$825.00	
	Awards	$1,111.84	
	Meetings	$115.17	
	Seminars	$668.67	
	ABC support	$500.00	
	Memorial donations	$-	
	Endowment Exp., admin.	$79.00	
	Journal	$15,714.76	
	Phone	$67.29	
	Refunds	$115.00	
	Newmember	$19.20	
	Consultations	$-	
	Other	$770.44	
	Total Expenses	$36,390.25	$(36,390.25)
	Cash Balance March 31, 1999		$75,423.40

		Cash on hand 3-31-99	
31-Mar-99		Money Market Savings	$43,509.60
		Checking	$7,413.80
		CD 1	$10,000.00
		CD 2	$10,000.00
	Michael John Parigian	Seminar Checking	$2,000.00
	CAC-Treasuer	Spring 99 seminar seed	$2,000.00
		Fall 99 seminar seed	$500.00
			$75,423.40

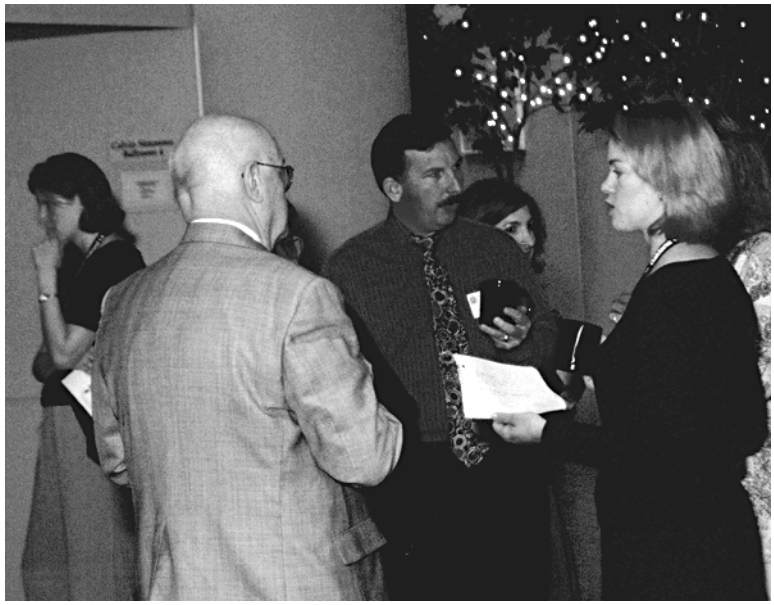
Note: Merchandise Account Balance March 31, 1999 = $1,911.88

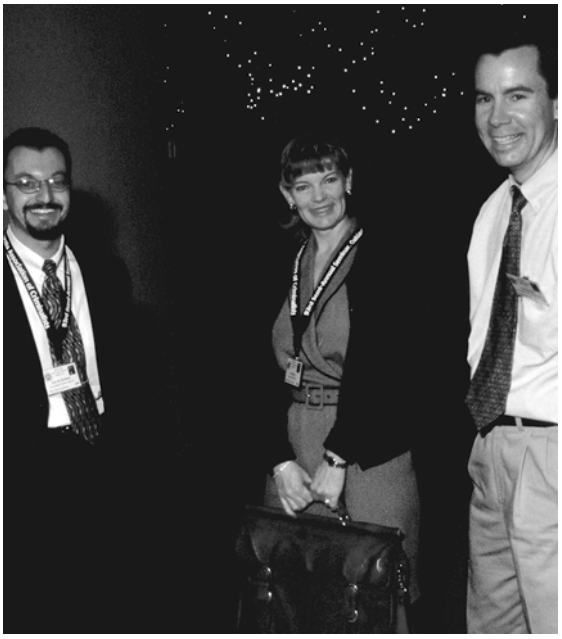
CACSPRING



OAKLAND '99

PaineWebber financial advisor David Waisbein gives good news to the CAC board about the growth of the portfolio.





Q & A: Accreditation: Frequently Asked Questions

The laboratory accreditation business is booming! There are currently 182 accredited laboratories with applications from 25 new laboratories in progress. These applications are from 17 new agencies. In addition applications from 9 laboratories are in the process of re-accreditation. As best as can be estimated, this represents less than half of the U.S. crime laboratories that can be candidates for accreditation. With the increasing emphasis on accreditation, it is anticipated this number will quickly increase over the next several years.

To maintain accreditation, a laboratory must demonstrate compliance with a number of essential criteria. Even though these criteria are well established, occasionally the interpretation of them is misunderstood and incorrect information gets passed on by word-of-mouth. The ASCLD/LAB Board works diligently to provide a consistent level of interpretation to these standards. At the recent American Academy of Forensic Science meeting in Orlando, several questions were asked regarding the interpretation of criteria surrounding proficiency testing and standard methods that I believe are important to share.

Q: Must an employee of an ASCLD/LAB accredited laboratory be proficiency tested annually in every type of analysis he/she undertakes?

A: NO. The proficiency testing requirement does not extend to the analytical method; it only speaks to the particular casework discipline. Each employee doing casework must undergo proficiency testing in every discipline in which he/she does casework. The disciplines are Controlled Substances, Trace Evidence, Serology, Questioned Documents, Toxicology, Firearms/Toolmarks, DNA and Latent Prints. This testing must be done annually and can be from either an internal or external source (except for DNA, which requires 2 external tests per year).

It is recommended (an "important " not an "essential" criterion) that proficiency testing be taken down to the sub-discipline level. The identified sub-disciplines are arson, hair, fibers, glass, paint, explosives and gunshot residue in Trace evidence; firearms and toolmarks in Firearms/Toolmarks; alcohol and drugs in Toxicology; and footwear/tiretrack evidence in the discipline to which it is assigned.

Accreditation should not be looked at as a straitjacket that shackles a laboratory from doing good and necessary work.

Beyond individual proficiency testing, each accredited laboratory must participate in one annual external proficiency test per discipline from an approved test provider.

Q: Can an ASCLD/LAB accredited laboratory do work in a discipline which is not included in their accreditation certificate?

A: YES, under certain situations. When a laboratory applies for accreditation, it must include all the disciplines in which it does casework. If a laboratory brings on a new discipline after accreditation is granted, it may choose to delay including this as an accredited discipline until the next accreditation inspection. The laboratory must declare this in their Annual Accreditation Review Report and comply with all the essential criteria involved in this new discipline.

An accredited laboratory may also be performing analysis in disciplines that are not currently accredited by ASCLD/LAB (i.e. crime scene reconstruction). When an accredited laboratory performs casework in a discipline that is not accredited it must not imply in any way that it is accredited in that discipline.

Q: Is an ASCLD/LAB accredited laboratory precluded from performing an analysis if they do not have an official written procedure on file?

A: NO. An accredited laboratory needs to have written procedures for all the commonly occurring analyses. The laboratory needs to have flexibility if a case necessitates doing a non-routine analysis. Before employing the test, the examiner/laboratory must be able to demonstrate that the method is valid and scientific. A copy of this documentation should be included in the case file or laboratory procedures file.

Hopefully, this provides some helpful interpretation of these criteria. Accreditation should not be looked at as a straitjacket that shackles a laboratory from doing good and necessary work. Accreditation is a form of quality assurance that helps all of us in providing a better service to the criminal justice community.

– William C. Smith
ASCLD/LAB Chairperson

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JOHN**SIMMS**

Quality Assured

Summer is here at last and Quality Assurance has been really busy. Quality Assurance was covered at the Spring CAC seminar in Oakland. The seminar was interesting and quite lively at times but will not be covered here.

Strategic Recommendations

ASCLD/LAB held a strategic planning meeting in Orlando, Florida in April. This was a two-day meeting with select representatives detailing a plan of proposed changes for ASCLD/LAB process and procedure. The recommendations range from Board operations to the inspection process. The proposals were presented to the Board this last June. I am not yet able to release any of the details of the proposed changes. Those present at this meeting were JoAnne Given of the NIS Laboratory, Frank Fitzpatrick of the Orange County Coroner's Lab, Manny Valadez of the Texas Department of Public Safety, Cliff Vander Ark of the Arizona Department of Public Safety, Robin Cotton of Cellmark, Bill Tilstone of NFSTC, Tom Nassar of California DOJ, and yours truly. Mike Sheppo of the Illinois State Police facilitated the group discussions for two days.

I can only say that these are just recommendations subject to Delegate Assembly approval. Once the board has a chance to look at them, I will be able to publish. A second meeting by this same group is apparently going to be required to hash out a proposed implementation timeline for the recommendations. The discussions were very organized, at a few times lively, and always productive and positive.

On the heels of this Orlando meeting came the FBI-hosted International Symposium on Quality Assurance in San Antonio, Texas.

I cannot present the entire symposium here, but I can present a few headlines.

The discussions were very organized, at a few times lively, and always productive and positive.

They Are Going To Use Bayesian Models

Bayesian statistics in Forensic Science have been discussed for a long time. The American system of Forensic Science seems content to stay away from this statistical interpretation of casework results.

Likelihood Ratios: The key concept is building likelihood ratios for the evidence that is being examined. In the case of similar fibers on victim and suspect clothing, likelihood ratios are built based on characteristics such as the type of evidence and commonality. The likelihood ratios "help" answer the ultimate question in the case: is this defendant the one who committed the crime?

Negative Results: The flip side of likelihood ratios is the fact that not finding anything takes on new importance in Bayesian methodology. Most of us would testify under normal circumstances that not finding anything incriminating against the suspect is really a neutral finding....you can draw no conclusion as to the defendant's role in the crime. There are always exceptions to the rule. Bayesian approaches now tell us that we can go into court and testify that negative results means a likelihood that the defendant DID NOT commit the crime.

Who uses the Bayesian approach? Apparently the English system is moving to the Bayesian methods and is quite ready to testify to the above findings. I consulted one of the more well-known American names of Forensic Science (Pete DeForest) and asked him about Bayesian concepts. His summation was that there is no real way to establish likelihood ratios for positive evidence and there are too many variables to draw an exculpatory conclusion in most cases for negative results.

ABC Testing In Europe

There was one quick report on the certification process of English forensic scientists. There had been a dry run of the ABC certification process in some portion of the English system and the report indicated that it worked well. The emphasis, however, was on a registry system that would be overseen by court officials, attorneys, and other consultants.

The Fundamentals

There were many presentations that focused on the importance of education and training of the forensic scientist and documenting that training process, and testing for competence. Some thought was given to the SWG groups creating training

outlines for their respective disciplines. This would not be attempted until after the SWG groups had created their final guidelines for job standards.

To ISO or not to ISO

At both the Florida and San Antonio Meeting the switch of ASLCD/LAB over to ISO 25 was discussed. There has been some discussion with various circles that going to ISO criteria for accreditation would be impossible for many labs because all the elements are "E's", or essentials. Bill Tilstone corrected that misconception by comparing the two systems.

First, ASCLD/LAB does a better job in that it has created clear quantitative guidelines for the various E, I or D criteria. On the other hand, he points out, ISO guidelines have no quantitative thresholds, but many of the guidelines have optionals built into them would allow for a more negotiable process.

Why switch? Questions have been asked about why ASCLD/LAB would switch to ISO 25 in the first place. ISO 25 is an international set of standards. If the ASCLD/LAB program were to be evaluated and accepted into the fold as

ISO 25 compliant, it would add an international note of credibility to the process. In other words, who accredits the accreditors? ISO 25 provides an outside assessment of the process and acceptance provides accreditation for the accreditors.

Many International Organizations

Several presentations covered the activities of so many different organizations that were dealing with quality assurance standards and accreditation types of activities both here and abroad that the acronyms became difficult to manage. QA is truly a global effort.

Interesting Summary On The Search For Truth

What seminar or symposium would be complete without an appearance of the Defense Attorney? The FBI provided one to talk about his perspective of the scientific evidence and the expert witness.

He stated very definitively that the court process and trial is not a search for truth. Yes, that's right. The trial is not a search for truth. It is "...an assurance for fairness so that we can all sleep at night..." Who wins? "Whoever puts on the best show." He was very careful to point out that the best show does not always mean the most bells and whistles.

If you are interested in looking at more specific notes on this symposium, I do have a WordPerfect file of over 50 pages of notes from the papers and I can send you an e-mail file. My e-mail address is tzfan@yahoo.com

The next QA column will examine the specific recommendations for ASLCD/LAB restructuring that went to the Board.

A Word From Our Sponsor

This microscope was donated to the Oakland Seminar as a door prize.

Spring 1999 Seminar Abstracts

The Role of the National Center for Forensic Science

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Information will be presented to inform the audience about the federally funded National Center for Forensic Science at the University of Central Florida and its management of the new Technical Working Group for Fire and Explosives Examinations.

The mission of the National Center for Forensic Science (NCFS) takes it into many areas of interest to the forensic community. Included in the many focus areas is an interest in conducting fundamental research to gain insights into the basic nature of fire and explosion reactions. Also of interest is providing the support needed for the development of standard protocols for arson and explosion debris analysis. Additionally, the NCFS is interested in promoting the use of electronic media to access and exchange forensic information and making educational opportunities available to practicing professionals and full-time students. Lastly, the center is interested in partnering with the forensic science, law enforcement and business communities to promote improvements in the forensic science community.

To this end, the CCFS sponsored a symposium in August 1997 which brought together experts in the fields of arson and explosion debris analysis to assist in identifying problem areas. Additionally, the NCFS has been named to administrate the Technical Working Group for Fire and Explosives Examinations (TWGFEX). TWGFEX is the latest in a series of several working groups which have been formed in the forensic science community. Its advisory board is made up of members from the International Association of Bomb Technicians, the laboratories of the Bureau of Alcohol, Tobacco and Firearms, Texas Department of Public Safety, Colorado State Police, Orange County Sheriff's Office, California and Federal Bureau of Investigation to name but a few. Its committee chairs and members are from diverse state, local and federal laboratories around the United States. Recently, the TWGFEX commissioned a major laboratory survey for fire and explosives debris examiners. The results of this survey and other aspects of the NCFS will be discussed.

To enhance the success of the National Center, presentations are being made to regional forensic science associations and other pertinent groups so that its mission may be promulgated.

Microchemical Identification of Gamma-Hydroxybutyrate (GHB)

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Objective and Conclusion: The formulation, use, advantages and limitations of a new microcrystal reagent for the detection of Gamma Hydroxybutyrate (GHB) are described.

Gamma-hydroxybutyrate (GHB) was recently made a Schedule II Controlled Substance in California, obligating criminalistics laboratories to provide conclusive identification of suspected samples. Unfortunately, the nature of the compound complicates this task. Problems such as impure samples, need for derivatization for chromatography, conversion of the sample to and from the precursor during analysis, and the extremely hygroscopic nature of the drug all make identification by instrumental techniques difficult. The authors have developed a microcrystal reagent that can overcome some of these problems.

The reagent, a 1% w / v aqueous solution of cupric nitrate and silver nitrate (e.g. 0.1 gram of Cu (NO3)2 and 0.1 gram of AgNO3 in 10.0 mL of water), forms distinctive crystals with a solution of GHB in less than five minutes. The GHB crystals are easily distinguishable from crystals formed upon evaporation of the reagent. Furthermore, the reagent does not form crystals with the precursor Gamma Butyrolactone (GBL). The reagent will form crystals in aqueous GHB solutions of concentrations down to 2 mg / mL, and will work with mixtures of GHB and GBL after minimal cleanup with toluene.

The reagent was tested for specificity against over 25 compounds, including commonly occurring controlled substances, controlled substances that may have a biological effect similar to GHB (e.g. barbiturates and flunitrazepam) and two isomers of GHB (Alpha- and Beta-Hydroxybutyrate). None of these tests resulted in crystals similar to those for GHB. Finally, the Silver / Copper Reagent was tested in a blind trial against ten unknowns. Two were correctly identified as GHB, one GHB sample was not identified as such, and none of the other samples were incorrectly identified as GHB. The one false negative was not on a pure standard, and may have been due to the presence of interfering ions in the solution causing precipitation of silver salts.

Microcyrstal tests are a fast and reliable method for identifying suspected controlled substances. The addition of such a test for the identification of GHB will give laboratories greater flexibility in performing what can be a difficult analysis. The lack of false positives in the testing shows selectivity for GHB, avoiding the danger of misidentification. While there can be false negatives due to the various factors that affect microcrystal tests, the combination of this technique with instrumental data should allow for rapid and accurate identification of Gamma Hydroxybutyate.

More Is Not Always Better

Larry Blanton, D-ABC Los Angeles Police Department 555 Ramirez Street, Sp. #270 Los Angeles, CA 90012

Two Forensic DNA cases are compared and contrasted. The emphasis of the presentation will focus on how detectives and prosecutors approached each case from a forensic perspective and how this impacted the Crime Laboratory.

The Frequency of Heteroplasmy Differs Across Tissues

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This paper provides a better understanding of heteroplasmy and the challenges of interpreting data from mtDNA analysis of tissues.

Mitochondrial DNA (mtDNA) has proven to be a useful tool for forensic studies because of its high copy number, maternal inheritance and high degree of sequence variability between individuals. For these reasons, mtDNA analysis is currently used by specialized labs for identification of telogen hairs, missing person remains and has been proposed for the identification of mass disaster remains. It has been suggested that a number of tissue types from the same individual be investigated to verify an individual's mtDNA type is identical from tissue to tissue. This should be done prior to the routine use of mtDNA typing in cases of mass disaster. This investigation is important since there is evidence of heteroplasmy (more than 1 mtDNA sequences within an individual) in the normal population and since differences in the level of heteroplasmy across tissues has been observed in individuals with mtDNA diseases. The purpose of this study is to determine if an individual's mtDNA type differs across various tissue types, and if the frequency of heteroplasmy differs across tissue types and among age groups.

In this study, an immobilized sequence specific oligonucleotide (SSO) probe system was used. It consisted of 16 SSO probes that detect sequence polymorphisms within 5 regions of the hypervariable region II (HVII). This was done in order to screen for heteroplasmy and type tissue samples (heart, brain, muscle and blood) from 43 individuals. Sequence and cloning analysis were conducted to confirm that the observed multiple sequences were attributable to heteroplasmy, and not contamination. The frequency of heteroplasmy differed across tissue types being higher in muscle, and across age groups. Heteroplasmy was detected by the strip typing system in 5 of the 43 individuals (11.6%) and was detected by sequencing the HVII region in 22 of the 43 individuals (51.2%). Results from statistical analysis suggest that heteroplasmy increases with age, which may pose interpretation challenges. The results from this study also suggest that heteroplasmy may occur at certain positions more frequently than others (heteroplasmic "hot spots"). In conclusion, since the mtDNA type was not found to be identical from tissue to tissue, the observations from this study should be considered if mtDNA typing is used for identification of remains from mass disaster.

An Evaluation of the Department of Defense DNA Specimens Repository Quality Control Program

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In 1992, the Department of Defense (DoD) established a DNA Registry comprised of DNA Specimen Repository (is this now AFRSSIR?) and the Armed Forces DNA Identification Laboratory (AFDIL) for the specific purpose of human remains identification. The following year, the Assistant Secretary of Defense for Health Affairs issued guidelines for the collection of DNA specimens. Whole blood, either from venipuncture or fingerstick, is collected as a bloodstain on Schleicher & Schuell #903 filter paper. The bloodstain is air-dried and stored in a vacuum-sealed foil barrier pouch. One bloodstain card is stored in the service member's medical records and the other bloodstain card is stored at -20°C at the DNA Specimen Repository. In addition, an oral swab (buccal scrapings) is collected and stored in isopropanol at room temperature at the DNA Specimen Repository. From June 1992 to July 1997, approximately 1.890 million oral swabs were collected. To date, the Repository has received XXX DNA specimens and, on average, XXX specimens come into the Repository daily. All DNA specimens are to be stored for 75 years before being destroyed.

AFDIL has recently completed a six-month (June 1998 through November 1998) evaluation comparing bloodstains from the Armed Forces Repository of Specimen Samples for the Identification of Remains (AFRSSIR) to their corresponding oral swab also housed at AFRSSIR. This evaluation was carried out in conjunction with AFDIL's regular Quality Control (QC) program of reference bloodstains stored at AFRSSIR in order to try and determine the frequency of collection errors at military collection sites. Over this time AFDIL processed an average of 327.5 specimens per month totaling approximately 2000 specimens. AFDIL's regular QC program entails the typing of 600 specimens over this same time period. Specimens were analyzed with PE-ABI AmpFlSTR Profiler Amplification Kit (9 STR loci and gender determination locus).

An update of the DoD DNA Specimen Repository Quality Control Program and the conclusions drawn from this study will be presented in detail.

Crime Scene Notebook

Raymond J. Davis 4 Exeter Avenue San Carlos, CA 94070

Accreditation and certification have brought many positive changes to the practice of Forensic Science. The most important changes, in this author's opinion, are those which provide confidence to the legal community in which we serve. Documentation, standardized procedures, Quality Assurance / Quality Control and training, to name a few, have increased the trust and reliance judges and lawyers are placing on our work. The greater the confidence we can inspire, the easier our lives will be on the witness stand.

One of the elements that will certainly make our lives, if not our work, easier is the Crime Scene Notebook. This is an idea whose time has finally arrived. And if this idea has arrived without my knowledge, then the actual implementation of this idea deserves some credit. This comprehensive document that will allow any criminalist, crime scene investigator or detective to record every detail of a scene investigation without having to resort to a profusion of loose leaf material. Everything that needs to be documented will be contained within the notebook.

This notebook contains a crime scene procedural checklist, prepared forms, pages designed to hold Polaroid or 35mm prints, note pages and specialized paper for recording scene dimensions. In addition, a specific type of paper is utilized that will stand up to inclement weather and the numbered pages can't be removed without tell tale signs of tearing. The Notebook will provide the investigator a convenient and timely way to document the crime scene. This notebook will make it easier to review the investigator's work because everything will be contained within the notebook.

Te-Tech, Inc. (408) 745-1133, located in Sunnyvale, Califor-

nia, produces these notebooks. They can customize the notebook to our agency's specifications. Slides will be shown during the presentation demonstrating the features of the Crime Scene Notebook. I invite your comments and feedback.

A Death Investigation Conundrum

Raymond Davis 4 Exeter Avenue San Carlos, CA 94070

This case illustrates the events in a homicide case pitting the testimony of the medical examiner against the testimony of the criminalist. The conflict arose as to the distance the shooter was standing from the victim at the time of the fatal shotgun blast. This distance was critical in assessing whether the suspect would be tried for manslaughter or second-degree murder. Because this conflict was not resolved prior to trial, the prosecutors along with the investigating officer were left with no choice but to believe the popular and well known medical examiner over a lowly criminalist. Facts and evidence will be presented to highlight the conflict and the resulting interpretations made by the medical examiner and the criminalist. This conflict was eventually resolved during the trial with the jury reaching a verdict within 5 minutes.

Independent Review of DNA Casework

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Independent review of the records of DNA testing (lab notes, autorads, test-strips etc.) offers the criminal defense attorney an alternative or supplement to re-testing by an independent laboratory. In cases where all the biological evidence was consumed in the initial testing, independent review may be the only feasible defense approach available.

Over the past ten years we have reviewed over five hundred DNA cases. We have seen virtually every type of Forensic DNA technology and have reviewed casework from a wide range of US and overseas laboratories. In the course of conducting these reviews, we have often been struck by instances in which the effectiveness of DNA casework is undermined by easily avoidable technical shortcomings.

In this presentation, it is our intention to discuss examples of shortcomings in (1) testing strategy, (2) documentation, (3) report writing, (4) disclosure of discovery and (5) presentation. We hope that discussion of these issues will offer practical assistance to DNA caseworkers, and may help minimize unnecessary challenges to their work.

DNA Isolation Using Magnetic Beads from Blood, Semen and Mixtures of Epithelial Cells and Semen

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Magnetic beads can be used to purify DNA from blood, and to differentially purify epithelial cell DNA and sperm DNA from mixtures of epithelial and sperm cells

This paper describes the use of Dynabeads to purify DNA from blood, and to differentially purify epithelial and sperm DNA from a mixture of epithelial and sperm cells. Dynabeads are uniform spheres coated with magnetic material (Fe2O3 and Fe3O4) which provides them with superparamagnetic properties. Each bead is coated with a thin polymer shell which encases the magnetic material and provides a defined surface for the adsorption of selected molecules. In this study we used Dynabeads which specifically bind DNA. Dynabeads provide a simple, rapid and economical method of isolating high molecular weight PCR-ready genomic DNA directly from crude materials including whole blood, cultured cells and various human tissues.

The procedure involves two steps. First, DNA is released and adsorbed to the surface of the Dynabeads. The second step is the magnetic separation of the intact DNA / Dynabead complex from the other components in solution. The sample tube is inserted into a magnetic stand, and the DNA / Dynabead complex is attracted to the wall of the tube by the magnetic field. A series of washing steps are performed to remove any residual contaminants before the DNA is resuspended.

Our results indicate that 400, 200, 100, and 40 ng of DNA can be purified from 10, 5, 2.5, and 1 ul of blood, respectively, using 1 Unit (200 ul) of Dynabeads. This represents approx. 100% recovery of DNA assuming an average of ~6X103 white blood cells per microliter blood. Approximately 40 ng of DNA was obtained when 200, 100, and 50 ul of Dynabeads were used to extract DNA from 1 ul of blood, whereas approx. 25 ng of DNA was obtained using 25 ul of Dynabeads. This is within the range of the binding capacity of Dynabeads as specified by the manufacturer (Dynal; 200-500 ng DNA / 200 ul Dynabeads).

Comparable electrophoretograms were obtained when Dynabead and phenol purified DNA were amplified using the AmpFlSTR Profiler Plus typing system (PE Applied Biosystems, Foster City, CA), and the amplification products resolved and detected using the ABI Prism 310 capillary electrophoresis instrument (PE Applied Biosystems).

The breakage of disulfide bonds of sperm cells by DTT prior to Dynabead DNA extraction was required in order to yield any DNA. No DNA was isolated from sperm when Dynabead DNA extraction was performed without the addition of DTT. A higher concentration of DNA was purified if Dynabead DNA extraction was performed immediately after the addition of DTT to sperm than when DNA was incubated with DTT at room temperature for 2 hrs before Dynabead DNA extraction.

The requirement of DTT to aid in the lysis of sperm cells provided a means for the differential purification of DNA from epithelial and sperm cells from a mixture. The addition of Dynabeads to an epithelial / sperm cell mixture resulted in the lysis of epithelial cells, and adsorption of epithelial DNA to the magnetic beads. The remaining lysate contained unlysed sperm cells and epithelial cellular material that had not bound to the beads. The addition of DTT and Dynabeads to this lysate allowed the lysis of sperm cells, the adsorption of sperm DNA to the beads, and the purification of sperm DNA as a separate fraction from epithelial cell DNA.

Epithelial (e) and sperm DNA fractions were analyzed using the AmpFlSTR Profiler Plus typing system (PE Applied Biosystems, Foster City, CA). Results indicated that the e cell DNA fraction was contaminated with sperm cell DNA (ratio 2:1 of e cell:sperm DNA). More importantly, the sperm DNA fraction consisted predominantly

of sperm DNA (ratio 40:1 sperm:e cell DNA). Amplification was also performed on non-eluted DNA in the presence of Dynabeads. Signals were much higher than those of DNA eluted from the beads

Further research is being conducted to improve the yield of DNA from sperm cells.

The Crime Scene - A Criminalist's Perspective

Officer Pam Hofsass San Francisco Police Department / Forensic Services Division 850 Bryant Street, Room 435 San Francisco, CA 94103

I.Forensic Science Review A. Basic Unifying Principles: 1. Locard's Principle of Transfer 2. Divisible Matter Theory B. Application to Evidence 1. Association 2. Individualization

II. The Crime Scene A. Who's on first? B. Communication and Teamwork C. Outdoor vs. Indoor scene D. Overall steps: 1. Documentation 2. Processing 3. Collection E. Safety issues

III. One example of Strategies for collection:

Blood Evidence at the Crime Scene

A. Approach the scene / evidence as a scientist 1. Ask the right question: a. What is its significance? b. What tests will be done in lab?

B. Assessment / Recognition / Evaluation (see above) C. Presumptive tests; field vs. Lab D. Strategize 1. Documentation: rough sketch / diagram / measurements 2. Photography: stills / video 3. Note taking E. Evidence collection and preservation 1. Proper labeling and packaging 2. Storage F. Contamination issues: "DWS" 1. Avoidable versus unavoidable 2. Keep items separate 3. Control of the scene will help prevent problems G. Health and safety issues

IV. Closing Remarks: A. No such thing as the "perfect" crime scene B. Network / share information C. Debrief

The Origins of Evidence

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The learning objective of this paper is to re-examine and propose substantive and organizational changes to the current paradigm of forensic science. Forensic science is an applied science based on the laws of physics and chemistry. Over time, a set of fundamental precepts has developed that apply specifically to a forensic analysis. Traditionally five concepts are articulated: transfer, identification, individualization, association of reference and evidence items, and reconstruction of a physical event. We suggest that an additional sixth precept, the idea that matter must divide before it can be transferred, is necessary to complete the paradigm. Divisible matter is particularly useful in describing physical match evidence. Additionally, we propose that the paradigm logically divides into scientific principles that govern the generation of evidence, and concepts that pertain to the recognition, analysis and interpretation of evidence. The principles of divisible matter and transfer pertain to the generation of evidence before and during the crime event; the processes of identification, association by classification and individualization, and reconstruction describe the practice of forensic science starting with the recognition of an item as evidence.

Mixture Interpretation of PM+DQA1 Data from Fingernail Scrapings

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If sufficient information is present in reverse-dot blot mixture results, interpretations may be possible (based on dot intensities) which allows the DNA profile determination for the minor contributor to a mixed sample.

A recent homicide case involved the analysis of the victim's fingernail cuttings to determine if the assailant's DNA may be present. Twelve fingernail fragments were individually extracted and then typed via PCR amplification using the Perkin Elmer PM+DQA1 and the Perkin-Elmer D1S80 kit. Two of the twelve samples indicated DNA mixtures consistent with the victim and an additional source. Assuming the presence of the victim plus one other person and taking a conservative approach to the interpretation, the suspect was included as well as 1 in 950 Caucasians, 1 in 1400 Hispanics, and 1 in 610 Blacks.

A closer look at the dot intensities in the PM+DQA1 results and the D1S80 band intensity differences for the two mixture samples suggested exact genotypes for each of the seven loci examined. This DNA profile for the second contributor also included the named suspect as well as 1 in 82 thousand Caucasians, 1 in 210 thousand Hispanics, and 1 in 200 thousand Blacks.

Comparative Analysis of Physical Evidence

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Many forensic examinations are comparative analyses. Comparisons are frequently done in an attempt to determine if two objects came from a common origin. If the two objects have common properties, the conclusion is they (did) or (may have) come from a common origin. The concepts of class, subclass and individualizing characteristics are used by forensic scientists to evaluate the "uniqueness" of a particular object. In some cases this evaluation is straightforward and follows standard professional practices. In other cases, the evaluation is not straightforward. Several types of physical evidence (bare footprint, blood / semen, shoeprints and tobacco) are evaluated in this presentation.

A Case of the Phoenix Rising from the Ashes

Gregory E. Laskowski, B.Sc., MPA Kern County District Attorney Forensic Science Division 1431 L Street Bakersfield, CA 93301

Evidence recovered in a Kern County homicide investigation included a corroded partial pistol barrel, a partially charred carbide cutting wheel and various charred items from a burn site. Also recovered, were a spent .25 caliber TMJ bullet from the victim, a

spent .25 caliber cartridge casing from a second burn site, a damaged Raven model MP-25 semiautomatic pistol from an abandoned water well, two spent .25 caliber TMJ bullets from the carcass of the suspect's dog, and an empty holster from the suspect's residence.

The bullet from the victim, the holster from the suspect's residence, and the partial pistol barrel from the burn site were important pieces of evidence that revealed what the murder weapon was. X-ray analysis, Mikrosil casting, general rifling characteristic (GRC) databases, firearms reference collections, in addition to digital imaging and microscopic analyses were the tools and resources used to investigate this case.

The firearm in question or its remaining components were never recovered, yet the type, make and model were clearly identified as a result of this investigation. The processes will be described.

What They Say They Want vs. What We Know We Can Deliver: -or -Criminalists trying to understand Lawyers trying to understand Criminalists (or vice versa)

(Workshop Sponsored by the Virginia and A. Reed McLaughlin Endowment)

Ira J. Rimson, P.E. Director, Forensic Investigations Veridata, Ltd. Albuquerque, NM

Outcomes of many current legal activities depend on successfully applied scientific principles during investigation and analysis. Scientific data and their interpretations by "experts" take on preeminent roles in both criminal and civil litigation. Yet few attorneys, and fewer forensic scientists, take the time to examine the diametric opposition between the basic concepts, which form the foundations of both law and science.

This workshop will explore the conceptual and operational differences that cause cultural conflicts between attorneys and forensic scientists, and suggest methods for improving their mutual understanding and cooperation. Attendees will examine both traditional and innovative concepts of criminal and accident investigation and the effects of "conventional wisdom" on attorneys' and investigators' mindsets.

Changes to the Federal Rules, both of Evidence and Civil Procedure, following the U.S. Supreme Court's Daubert ruling have led courts to deal more deliberately with scientific knowledge. Attendees will learn methods for evaluating the quality of their work processes and products, validating evidentiary relevance, and evaluating analytical logic as their investigation progresses, enabling them to avoid the unverified investigation data and unsubstantiated "expert" opinions which frequently lead to charges of "junk science" and "Hired Gun" experts, and implausible legal arguments.

Attendees are invited to bring perplexing investigation data problems for use as examples in the practical section of the workshop.

The Evolution of Forensic Science

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The purpose of this paper is to understand the evolution of concepts that has brought the profession of forensic science to its present state. As with any endeavor, it is useful to study the lessons of the past so that one can at least make new mistakes rather than recycle the old ones. We identify the roots of forensic science, trace some of the history, and highlight the evolution of concepts as well as practice. We hope that a brief reflection on the past will prove useful in guiding the future course of forensic science. A comprehensive Timeline of Forensic Science will be distributed. In the following presentation, The Origins of Evidence, we re-examine the current forensic paradigm.

Case Review

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The profession of forensic science has only recently (in the last decade) begun to define minimal expectations for laboratories and criminalists, the compliance to which is still largely voluntary. One of those expectations is for internal technical and administrative review of a case, before it is released from the laboratory as a signed report. Even in the best lab, the most competent criminalist may make an analytical or judgmental error that may slip by a harried supervisor. In the worst cases, malicious intent or incompetent analysis my completely invalidate a work product. It is the obligation of opposing counsel to retain a qualified expert to review the report, including supporting notes and data, to determine, 1) if the right question was asked, 2) if the data support the conclusions, 3) if any egregious errors occurred in any aspect of the collection, preservation, analysis, or interpretation. A detailed framework for review will be presented and particular points illustrated by case examples.

Triple Homicide or Double Homicide/Suicide?

Faye Springer Sacramento County Forensic Services Laboratory 4800 Broadway Suite 200 Sacramento CA 95820 916-874-9240

A crime scene contains a wealth of information about how and why a crime occurred. This information must be recognized at the time the scene is processed for physical evidence, or it will be lost forever. Not only can the information be lost, but the investigators will never know it even existed. This presentation will describe a crime scene scenario with an emphasis in recognition of reconstruction evidence.

At noon on a Thursday, the Riverside Fire Department received a call from a neighbor reporting a house fire. The house was totally engulfed in flames by the time the fire department arrived. When they entered the house, the fire department discovered three bodies in three different rooms. The Riverside Police Department was notified, and an investigation into a possible homicide / arson began. This presentation will walk the audience through the crime scene and will analyze the reconstructive significance of the different items of evidence. The audience will then be asked whether this crime is a double homicide / suicide or a triple homicide.

Scientific Analysis or Tunnel Vision - Experience from Notorious Australian Forensic Cases

Jane M. Taupin Victoria Forensic Science Centre Victoria Police, Forensic Drive Macleod, 3085 Australia

Two celebrated Australian murder cases in the past two decades - the Chamberlain convictions and the conviction of Edward Splatt - have highlighted the serious problems that may exist when courts are faced with complex scientific evidence. These cases possessed distinctive features which attracted media attention that precipitated two Royal Commissions.

Baby Azaria disappeared from a campsite in central Australia and her body was never found. Her mother was convicted of her murder, although she protested that a dingo had taken her baby. The presence of blood in the Chamberlain's car and the damage to Azaria's jumpsuit were two of the central forensic issues at two inquests, a trial and the Royal Commission. Major flaws in the original scientific evidence were uncovered during the Commission of Inquiry and the Northern Territory Government finally pardoned the Chamberlains. The Victoria Forensic Science Centre was the agent for the Royal Commission of Inquiry into the Chamberlain convictions and thus was faced with the problem of reevaluation of forensic evidence. Some of the particular problems encountered will be discussed, and how the need for experimentation rather than reliance on theory was clearly demonstrated.

Edward Splatt was convicted of the sexual mutilation and murder of a 77-year-old widow in South Australia. A Royal Commission was held some seven years later where the forensic evidence was extensively debated. The evidence relied predominantly on the presence of paint, fibers and metal in the widow's home which allegedly could be traced to the accused. Again, serious problems concerning this evidence were revealed during the Commission of Inquiry and Splatt was pardoned.

A failure to recognize the limitations of the forensic evidence and a propensity to fit the evidence to an alleged scenario occurred during both original trials. Whilst the initial impact on the popular perception of forensic science was negative, there was a lasting positive impact on the discipline that resulted from these reviews.

Treasure on the Family Jewels: Microscopy and DNA Typing of Cellular Material on Penile and Scrotum Swabs

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Terry Spear Department of Justice 4949 Broadway, Rm. A-104 Sacramento, CA 95820

The objective of this paper is to show an appreciation of the value of biological evidence collected in a suspect examination. In this paper, microscopy and DNA typing demonstrate the presence of female cellular material on penile and scrotum swabs.

In sexual assault cases involving male suspects, finding victim's DNA types on penile swabs can be used to provide evidence of recent sexual activity. Given that semen is not found in a significant number of sexual assault cases, this evidence may be the only biological evidence linking a suspect and victim. In cases where the suspect wore a condom, the swabbed areas of the penis may not contain cellular material from the victim. This study looked at the feasibility of detecting cellular material (from the female partner) on the scrotum after coitus. In this study, the male volunteers were asked to take both penile and scrotum swabs following coitus. All of the samples collected were taken within a 15-hour period after coitus. These samples were then microscopically evaluated and extracted for DNA. Microscopy showed the presence of epithelial cells in every sample (penile swab and scrotum swab). Glycongenated epithelia were seen in 11 of 13 penile swabs and 10 of 13 scrotum swabs. Sperm cells were less prevalent than epithelial cells and were seen on the penile swabs from only two volunteers. Sperm cells were observed on only one of the scrotum swabs. The swabs were then extracted for DNA using a Chelex procedure. Not surprisingly, less DNA was obtained from the scrotum swabs than from the penile swabs. The calculated amount of DNA obtained from these samples ranged from 7ng to 150 ng. The DNA obtained from these samples was then typed using the DQAlpha and AmpFISTR Green 1 loci. Typing results were obtained from all 13 sets of samples (penile / scrotum sample). In the vast majority of these samples, only the female partner's types were detected. When the male's type was present, it appeared only as a minor component of the mixture. These samples may prove to be valuable in the investigation of certain sexual assault cases.

Casework Examples / DOJ Riverside

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The California Department of Justice field lab in Riverside is one of the few labs in the State which performs only conventional serology for forensic biology related cases. We have the option of sending casework out to other labs for the purpose of DNA work (San Bernardino and DOJ Berkeley). Several cases will be presented which will illustrate the obvious need for DNA analysis in order to answer questions asked of us by the Criminal Justice System.

An Analysis of Consecutive Striae on Random and Consecutive Chisels

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This study compared the striae patterns left by six consecutively manufactured chisels and four chisels of the same size and brand chosen randomly (without respect to the sequence of manufacturing). These 3/4" wide wood chisels were obtained from Buck Brothers, Riverlin Works Chisels. Test marks were made in lead tape using a jig that held the chisels at a 30-degree angle. The marks were then indexed and compared. A one-centimeter length of each chisel mark was compared in the phased position, in five predetermined non-phased positions, and in one "best" non-phased position (as determined by the analyst). Indexed and non-indexed (mismatches) of chisel marks made from the same tool were compared in a like manner.

A group of six student interns were used for the data collection. The criteria used for analysis required the analyst to: (1) count the total number of striae observed in each mark, (2) count all matching striae in each comparison and (3) count the number

and length of any runs of consecutive matching striae. For example, data on a comparison of two tool marks consists of the stria count for each tool mark, the number of isolated (single) matching striae, the number consecutive pairs of matching striae, the number of consecutive triplets of matching striae, and so forth, conveniently designated as the events of 1X, 2X, 3X, etc.

Data was collected from the phased (match) position of tool marks from four chisels. Among these tests, consecutively matching striae greater than 5X were routinely observed and multiple occurrences of 4X were commonly seen in one mark. From the match position, these marks from the same tool were also examined when offset to five different non-phase positions (shifted successively by 1 mm). Among these tests, no occurrences of 4X or greater were observed. Single occurrences of 3X (that is, one in the full 1 cm comparison area) were found occasionally, with multiple 3X occurrences showing up rarely. When the single subjectively "best" non-match position was selected (rather than placing marks at pre-specified, non-phase positions) the results were the same: no 4X occurrences, occasional single 3X occurrences and only rarely a pair of 3X occurrences. There was a significant increase in the number of I X and 2X occurrences in these best non-match positions. The subjective choice of best phasing position, at least among newly trained analysts, appears to be dominated by the overall number of matching lines, as indicated by the 1X and 2X occurrences, rather than by a greater number of 3X occurrences.

Overall, the absence of any 4X or higher occurrences in the mismatched positions, along with their routine and multiple occurrence in properly phased corresponding tool marks, provides the foundation for the hypothesis: Chisel marks have an objective, measurable threshold that can be set, above which one can be certain that a given correspondence results from an association rather than at random. Association is taken to encompass circumstances where an individual tool is itself individualized to a mark, as well as circumstances where a less than individual association is made, as in the case of non-individual production methods resulting in tools that produce similar marks. The present hypothesis is that we can unambiguously differentiate random from associative correspondence. Study of the production methods and wear of the tool is necessary to determine the meaning of the association (between the extremes of class and individual). In the present work, with ground chisel surfaces, the production process would be expected to result in no greater similarity among successively manufactured chisels than among others of the same class. This leaves the random occurrence of matching lines as the mechanism causing the correspondence seen in known mismatches.

Further studies were made on comparisons of marks from different chisels. Marks from six consecutively manufactured chisels were inter-compared at fixed, phase positions relative to the chisel blade dimensions, as well as in the best non-match position. No observations of 4X or above were seen in any of these 30 intercomparisons (each of which was repeated independently by five separate analyst). Marks from another four chisels of the same make and manufacture, chosen without respect to manufacturing order, were also compared and inter-compared in the above manner with the same qualitative results.

These results strongly support the hypothesis that an objective threshold, based on consecutively matching striae, can be set such that there is a clear distinction between random and associative stria correspondence. This distinction was explicitly apparent, even with analysts of relatively little experience. It can be anticipated that more highly experienced examiners would be sensitive to the same visual data and be able to adapt it as necessary to other types of tool marks.

Modeling of the occurrence of 1X, 2X and 3X events on non-matching comparisons showed that it closely followed an exponential decay curve, providing a theoretical model, along with the empirical rules described above, that can serve as a foundation for future research.

Keywords: Toolmarks, individuality, statistics

Silencer Marks in the Absence of a Silencer: A Case Study

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This case involved the examination of bullets recovered from the body of a homicide victim. Examination of the bullets revealed the presence of shearing marks, which suggested that a silencer was used.

Information concerning markings on bullets caused by silencers has been previously published in the AFTE Journal. Miller reported a case involving two silencers in which it was observed that one silencer sheared the bullets, resulting in identifiable striae, while another caused a distinctive groove from the shoulder to the nose of the bullets (1). Miller also reported a case involving the examination and identification of bullets to a specific firearm and silencer combination (2).

The laboratory became involved in the investigation of two homicides, which were performed during the commission of two separate robberies. One of these involved the use of a firearm which, according to a witness, had a silencer attached to it at the time of firing. After a lengthy investigation, an arrest was made, but according to the suspect, the firearm was dismantled, the barrel broken off, and the pieces were subsequently discarded into the San Francisco Bay. Evidence originally recovered from the scene consisted of four expended Companhia Brasileira De Cartuchos (CBC) brand, caliber .25 AUTO cartridge casings and four fired caliber .25 AUTO bullets recovered from the body of the victim at autopsy. Several months prior to the arrest of the suspect, a no gun ID of the autopsy bullets revealed the suspect firearm to be one of several caliber .25 AUTO semi-automatic pistols, which included a Jennings Bryco J25.

With the aid of the suspect, investigators recovered only the frame of the dismantled Jennings / Bryco brand, Model 25 / J25 semi-automatic pistol from the San Francisco By, seven months after the murder took place. As such, no identification of the bullets recovered from the body of the victim could be performed. The suspect, who was an accomplished mechanic and machinist, provided a detailed description of the construction of the silencer to investigators during his confession of the two murders. The silencer was constructed of alternating steel washers and rubber baffles inserted into a piece of machined aluminum tubing approximately 8" long ad 3 / 4" in diameter. For more information about silencer deign, refer to the article by Hueske (3). Based on these plans, the Rangemaster of the San Mateo County Sheriff's Office was able to reconstruct the silencer for court display purposes (with appropri-

ate ATF approval as well as California Department of Justice exemption for law enforcement personnel.)

An identical Jennings brand Model J25, caliber .25 AUTO semi-automatic pistol was procured from the laboratory's Firearms Reference Collection for test firing, with and without the constructed silencer. Test fires with the silencer attached revealed the consistent presence of shearing marks which were surprisingly similar to those observed on two of four of the autopsy bullets recovered from the victim. Despite the suspect's recanting of his confession of making and using the silencer (which weighted heavily towards pre-meditation of the robberies and subsequent homicides.

The circumstantial evidence of the presence of silencer shearing marks in combination with the testimony of the suspect's girlfriend that the suspect had indeed constructed and used a silencer similar to that of the reconstructed silencer was an integral part of the information which aided the jury in rendering a guilty verdict.

This laboratory very rarely encounters firearms equipped with silencers. If fired bullets are recovered from a crime scene or victim and display consistency in damage, then the possibility of the use of a silencer or other accessory equipment should be considered.

The Primary Examiner

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The advantages and disadvantages of the "generalist" philosophy vs. the "specialist" philosophy have been debated for years in the forensic community, and it appears in forensic laboratories the "specialist" philosophy is gaining ground.

The Oregon State Police Forensic Services Division is no different, and in the recent past has focused efforts on specializing both current and new personnel. However, specialization has come with a price. As increased specialization has occurred in the laboratory system, gaps in case management and customer service were recognized. To remedy this the concept of the Primary Examiner was born. This individual is trained to have a basic knowledge of all forensic disciplines and in effect is a version of the "generalist."

This presentation will describe how this "specialty" field of "generalists" was developed, what the duties and expectations of a Primary Examiner are (both technical and administrative), how a Primary Examiner is trained and how the concept has changed.

The Evaluation of ABAcard® HemaTrace

Theresa F. Spear and Neda Khoskebari

Introduction

The HemaTrace test was evaluated as a tool to characterize biological samples typically encountered as evidence. Our study focussed on the specificity and sensitivity of this test. As described by the manufacturer, Abacus Diagnostics, the ABAcard HemaTrace test is designed for use as a "confirmatory test for human (primate) blood" in "forensic casework laboratories." This test is described as a "rapid immunochromatographic test" which offers "extremely high sensitivity and specificity" and is capable of detecting trace levels of human hemoglobin. The test has been characterized by the Manufacturer as: *"Specific to human blood/ No interferences/Validated for forensic use."*

The HemaTrace is simple to perform. The HemaTrace test is a plastic card with two "windows." One of these windows allows the sample to be applied to the test membrane and the other window permits the analyst to view the antigen-antibody reactions. The sample can be extracted in a buffer solution provided by the Manufacturer. The test requires 150ul of this stain extract to be added to the sample ("S") well of the test device. Thus, the minimal amount of buffer solution to extract the stain should be at least 150ul. After this solution is added to the sample well, it migrates across the test device membrane to the test area where an immobilized (monoclonal) antihuman hemoglobin antibody captures the first antigen-antihuman hemoglobin antibody (presumably formed in or near the "S" well). This reaction (an antibody-antigen-antibody sandwich) is visualized as a purple-colored band formed by a dye attached to the mobile antibody. Above the test area (marked "T" on the device) is a control area (marked "C" on the device) which captures unbound mobile antibody. The control band (which controls for proper sample migration) needs to be visible in order to interpret a test result.

The manufacturer supplied a previous study by C. Swander and J. Stites entitled, "Evaluation of the ABAcard HemaTrace for the Forensic Identification of Human Blood. " This study evaluated the HemaTrace test using: (1) samples from a serial dilution of human blood, (2) a limited number of animal bloods, (3) human body fluids other than bloods, (4) "conditioned blood" or blood samples "subjected to conditions commonly encountered at crime scenes and in the laboratory" and (5) bloodstains produced from a set of serially diluted bloods. In general, this study reported that HemaTrace was significantly more sensitive than the Ouchterlony technique (the HemaTrace test produced positive results on blood diluted more than 1 to 1,000,000 compared to Ouchterlony which produced positive results on blood diluted a little more than 1 to 1,000). Further, they found that washed and bleached stains could still elicit a positive HemaTrace result (where Ouchterlony did not). Also, samples treated with various presumptive test reagents and dyes produced a positive HemaTrace result (as did the Ouchterlony test). As far as the bloodstains (produced from a set of serially diluted blood), the HemaTrace test was more sensitive than the presumptive test reagents: Hemastix and TMB. The HemaTrace test only produced positive reactions from bloodstains diluted approximately 1:32,000 (compared to the positive results obtained from liquid blood diluted more than 1:1,00,000). As far as specificity was concerned, this study reported no HemaTrace positive results with deer, cow, pig, horse, dog or cat blood. Finally, the authors state that: "Human saliva and urine stains also gave negative results." They do not indicate how many samples were tested.

In the present study, we evaluated both the sensitivity and specificity of the HemaTrace using human bloods, human body fluids (urine, saliva, semen-free vaginal swabs and semen), and animal bloods. Most of the samples were prepared by saturating a cotton swab with the sample and allowing it to dry. The samples were stored frozen until they were extracted with 100ul of deionized water, placed into a spin basket and centrifuged to recover a fairly concentrated body fluid stain extract. For most of the samples in this study, 10ul of this water extract was then added to 450ul of the supplied buffer. When liquid blood was tested, the serial dilutions were made in the supplied buffer solution. The final step was to add 150ul of the sample (in the buffer solution) to the test device. The test results were recorded at 2 minutes, 5 minutes and 10 minutes after sample addition. Test results should *not* be read after 10 minutes (some animal samples will produce a false positive reaction after this time). A control line was obtained with all of the tests run during this study and all of the test results were interpreted. None of the "blank" samples (containing water and the supplied buffer) showed a positive test result.

Sensitivity

Positive test results were obtained on a *liquid* blood sample diluted 1:1,000,000. At the 1:10,000,000 dilution, a negative test result was obtained. This demonstrates that this test is very sensitive. In addition, positive results were obtained on six different human bloodstains, which had been held frozen from 4 to 10 years.

Specificity

Bloodstains were made from the following 15 animals: beef, cat, chicken, dog, ferret, iguana, horse, mouse, parrot, pork, rabbit, sheep, squirrel monkey, tortoise and turkey. Only the sample from the squirrel monkey (primate blood) gave a positive reaction.

Body fluids (other than blood) were then tested with the HemaTrace test. *Significantly, positive reactions were obtained from*

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8 out of the 9 saliva samples, 3 out of the 3 semen samples and 3 out of the 5 semen-free vaginal swabs. Four of these body fluids were then diluted 1:10 and re-tested with the HemaTrace test. All of the 4 samples (two saliva samples, 1 semen-free vaginal sample and 1 semen sample) still gave positive results. None of the 8 urine samples that were tested produced a positive reaction with the HemaTrace test.

Discussion

This test is easy to perform and requires a minimal amount of equipment (centrifuge, timer and pipettes). The instructions that are included with the kit warn of a "High Dose Hook Effect" which may result in a false negative result if the sample is too concentrated. As in any test relying upon an immunological reaction, if the antigen concentration in the sample is too concentrated, the antigen will saturate the antibody and prevent the "antibody-antigen-antibody" sandwich from forming. This will result in a false negative reaction. In the course of this study, we did not encounter this situation, even when we used blood sample extracts that were a dark reddish-brown in color (then diluted with the supplied buffer). As a general guideline, an analyst should not test (place in the "S" well) a bloodstain extract that was significantly more colored than what would be appropriate for an Ouchterlony test (e.g. straw colored).

This test is also easy to interpret: a purple line at the control test area and at the test area is a positive result. A valid, negative result is a single purple line at the control area. Unfortunately, the disadvantage to this easy-to-interpret, yes / no format is that there is no opportunity to grade the positive reaction to gauge how much antigen (presumably hemoglobin) is present in the sample being detected. This is somewhat problematic since body fluids (other than blood) routinely give a positive reaction with this test. It is not uncommon to encounter body fluids (other than blood) which give positive presumptive tests for blood. These samples typically do *not* show the characteristic reddish-brown color associated with blood. The most likely explanation for these test results is that body fluids (e.g. saliva, semen, and vaginal samples) do contain trace levels of blood. This can create a problem in interpreting a very sensitive test for a human blood component such as HemaTrace. *Specifically, if a sample, other than blood, produces a positive test result, can you unequivocally say that sample is identified as human blood?* Abacus Diagnostics warns of this situations in the product instruction sheet when it states: (1) "Even if the test result is positive, careful forensic judgment should be made in conjunction with other information available from other testing and diagnostic procedures" and (2) "Due to the extreme sensitivity of the test, trace levels of hemoglobin might be detected occasionally in body fluids samples other than blood (e.g. urine, semen, stool, vaginal fluid, perspiration). However, knowing this fact, this limitation has no practical impact in the vast majority of cases." *Clearly then, if an analyst is to interpret a positive reaction from a HemaTrace device as meaning that a stain is (or contains) human blood, it will be done in the context of the visual appearance of that stain and chemical or microscopic tests.* Unfortunately, the very samples that might require the sensitivity of HemaTrace test (e.g. washed / diluted bloodstains) will also be the samples where these tests (color / presumptive / microscopic tests) fail due to the marginal nature of the sample.

Theoretically, one of the benefits of the HemaTrace over a conventional species test is that the antibody used in the test device is raised against human hemoglobin. Since hemoglobin is a primary constituent of blood, this test is designed to identify a sample as human blood. Most antisera used in forensic species tests are raised against more than one human serum protein. It is very common to find that species tests will produce a positive reaction to a wide range of human body fluids (e.g. semen, saliva and blood). Based on a species test, the analyst only knows that the stain is of human origin. The standard species test does not identify the type of body fluid being tested.

Given that the HemaTrace test produces positive results with body fluids other than blood, the only way to claim that it is *specific* for human blood would be to obtain negative test results with all of the non-hemoglobin constituents of common human body fluids. Without testing the HemaTrace device against a complete bank of human proteins found in all common human body fluids, it is not possible to state unequivocally that the antibodies used in this device are specific for human hemoglobin. If an analyst chooses to use a HemaTrace test to help characterize a biological sample, it will be important to remember to interpret the test result in the context of the standard tests used to characterize body fluids. The primary advantage of this test is its sensitivity. Blood can be diluted 1:1,000,000 and still elicit a positive test result.

The cost of each test device is approximately $3.50 / test. The ordering information is as follows: OneStep ABAcard HemaTrace (Blood) (25 tests / kit) Abacus Diagnostics, 6520 Platt Ave. #220, West Hills, CA 91307 Attention: M / S P-31-N. Phone (818) 716-4735.

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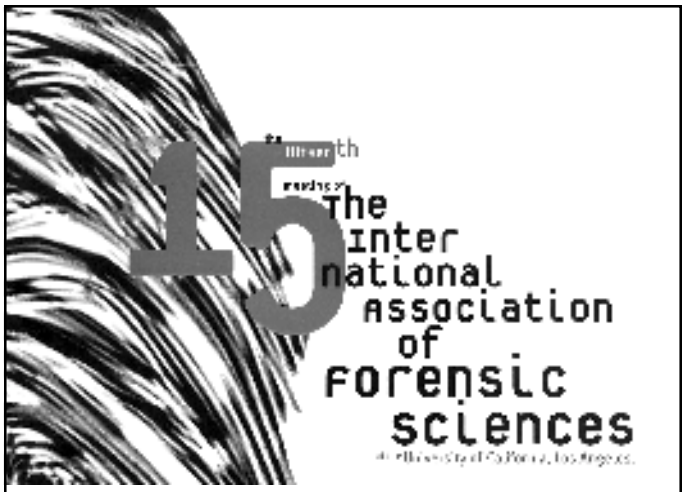
Obituary

E. Don Stottlemeyer

E. Don Stottlemeyer worked as a criminalist for 32 years. After graduating from the University of California, Berkeley he was drafted into the Army where he served as a military crime lab technician in Germany. After returning to civilian life two years later, he began employment with the Bureau of Criminal Identification and Investigation-now Department of Justice. He went on to work for the San Francisco Police Department for two years before retiring from the Sacramento County District Attorneys Crime Laboratory.

He was well respected in the field as a generalist, as was evident during his work on the Juan Corona case in Sutter County. In this 1971 case, Mr. Stottlemeyer worked with hair, blood and other evidence to link Corona, a farm labor contractor, to the deaths of 25 farm workers outside Yuba City.

E. Don Stottlemeyer was born in Marysville, and died at the age of 67 on March 12, 1999. He is survived by his wife of 41 years, Darlene Shearin Stottlemeyer



Once every three years, a unique event occurs in forensic science: the triennial meeting of the International Association of Forensic Sciences. What's more, this is the first time since 1978 that the IAFS has been held in the U.S. Imagine 2000 forensic scientists from around the globe meeting to exchange ideas and share experiences and you begin to have a notion of IAFS-1999.

Held on the campus of UCLA between August 22-28, the meeting officially begins on Weds. with plenary sessions on biological and chemical terrorism, human rights investigations and new technology. Attendees will have the opportunity to attend workshops on a subscription basis on Mon. and Tues. The meeting registration fees include two receptions and a Fri. evening banquet. A major exhibition is scheduled in Pauley Pavilion (the home of UCLA's famed basketball team) and an accompanying persons program may entice some out of the scientific sessions.

UCLA provides a lovely location for an international conference. The campus maintains housing accommodations in student apartments for most every budget. We hope that colleagues will bring their families to this meeting and enjoy the many vacation sites southern California has to offer.

The most up-to-date information about the meeting my be viewed at the IAFS web site. We hope to see you in August in Los Angeles. *—Barry Fisher*

http://www.criminalistics.com/IAFS-1999/

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Answers to Instrumental Pioneers: *(top: l-r)* Robert Finnigan, Arnold Beckman, Charles Elmer. *(bot. l-r)* William Hewlett, David Packard, Richard Perkin.

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