The CACNews

News of the California Association of Criminalists • First Quarter 2007

The President's Desk

ABC, CAC, GKE, & KSA'S

From the very outset of this discussion, I want to make it clear that I am inviting debate. It became clear at our last executive board and business meeting that there are some strong feelings on this issue. How CAC deals with this in the future depends on how you the membership feels today.

These are the details: ABC wrote to the CAC Executive Board earlier in the year and asked for a one-time stipend to help defray the costs of exam builders traveling to do work on the ABC exam. At the board meeting, it was clear there were some concerns over the direction the ABC had taken in its testing process. Initially, ABC's philosophy had been described as being based on the medical model as first you have to generalize then you specialize. The concerns over the new test process were echoed at the business meeting when I asked the membership what they thought about the financial support we were being asked to provide. The need for a more detailed discussion was clearly indicated.

Criminalist certification was developed several years ago with general knowledge being the only focus of the initial testing. This was known as the GKE, or general knowledge exam. This fit West Coast criminalistics in that most criminalists were trained as generalists. East coast criminalistics saw specialization as the best way to handle lab staffing although the smaller the lab, the more prone to generalization the management would be. With a big, fully staffed laboratory, specialization was routine. I came to California criminalistics as an east-coast trained criminalist, specialized in trace evidence, and I did suffer some culture shock.

The argument is that ABC is making a mistake by allowing specialty exams without having to take the general knowledge exam. This complaint has also been applied to specialty criminalistics in that a specialist does not have the necessary broad picture when handling and evaluating evidence.

West coast criminalistics continued to evolve to a point where some criminalists rotated every few years, and some remained as core specialists in the units. This was both a good and bad thing: good for the enrichment of the rotating criminalist, bad for management purposes as rotation of personnel meant downtime for training and this would have obvious impact on caseload. It was also bad in the sense that rotating criminalists had no opportunity to develop a depth of expertise that is common or expected today. Specialization today is dominant from coast to coast and there is very little opportunity to rotate as part of routine practice. Is this good or bad? Both this question and the answer apply not only to the practice of criminalistics but also to the evolution of certification testing.

ABC started with the general knowledge exam, then ultimately added the option of a specialty exam that could be taken after the general knowledge exam. But more recently, the specialty exam has taken the lead role away from the general knowledge exam. Now a criminalist can take either test with the difference being in the title awarded.

The argument is that ABC is making a mistake by allowing specialty exams without having to take the general knowledge exam. This complaint has also been applied to specialty criminalistics in that a specialist does not have the necessary broad picture when handling and evaluating evidence. Currently, for certification, criminalists do not have to take the general knowledge exam. This process no longer follows the medical or legal model. Those professional fields did not change their testing process. Why did ABC?

Practical laboratory management, resources, and the demands for greater expertise as technology advanced in all areas, have forced the development of specialization. In offering my own opinion, it seems very logical that ABC found it necessary to respond to the evolving field of criminalistics. As specialization became more common, ABC moved to offer specialty exams. In today's specialized forensic environment, ABC further responded to this change by making the specialty exam directly available without going through the GKE. This was not only driven by the nature of the development of criminalistics, but it also happened to make good business sense as well.

The GKE has become almost anachronistic in today's forensic field. If no one is being trained as a generalist anymore, why should ABC require the generalist exam be taken before you could take a specialty exam? To continue otherwise would be both out of touch with reality and bad business. ABC actually tried to find a balance by stocking the specialty exam with about 40% GKE questions. Is this enough? Is this still too much?

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John Simms
CAC President

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On the cover...
Among the innovative new products for forensic science on display at the recent fall seminar was this lighted headband from FoxFury. More photos from the meeting inside.

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

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

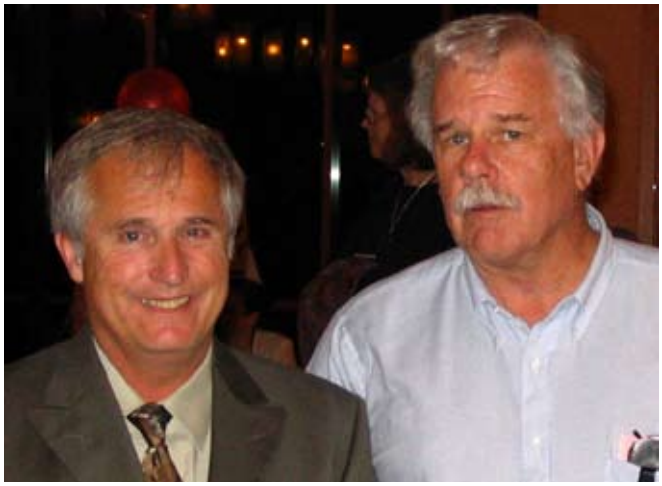
INSIDE

CAC*Bits*

From one of our sister associations: A murder case from Decatur, IL was featured on Court TV's *Forensic Files* on September 20. The episode is titled "A Concrete Alibi," because of some concrete comparisons done by the FBI lab. Suzie Kidd (*above*), from the Illinois State Police lab, was featured in this episode. She did some interesting button and rivet comparisons from a pair of jeans and a blouse. Suzie gave a presentation on this case at the 2005 MAFS meeting in St. Louis.

Submitted by Bob Blackledge

Showtime channel's new show "Dexter" uses bloodspatter as a theme. Our own Steven Schleibe (above) was tapped as a technical resource for Showtime's website demonstrations. Steve contributed to the "Bloodspatter 101" presentation found at www.sho.com



From the First to the Present

2006 Anthony Longhetti Distinguished Member, Ed Jones, (*left*) poses with George Sensabaugh, the first recipient of the award in 1983. Upon being presented the award by CAC President John Simms, Ed remarked, "I relied so much on the CAC when I ran a one-man lab, that it's great to be giving back to the association now."

SWGSTAIN Drafts Available for Comment

SWGSTAIN (Scientific Working Group for Bloodstain Pattern Analysis) has drafts of three documents that are ready for review by the BPA community. We are all going to have to live under whatever they come up with. Now is our chance to influence the content. SWGSTAIN's address is below, along with the links to various relevant documents. FYI, the drafts can't be printed they have to be reviewed on screen.

Their address iswww.swgstain.org/

The introductory note regarding the review process: www.swgstain.org/Documents/SWGSTAIN%20Peer%20Review%20Intro.pdf

Guidelines for Education and Training: www.swgstain.org/Documents/Training%20and%20Education%20Working%20Documet%20406.pdf

Quality Assurance: www.swgstain.org/Documents/SWGSTAIN%20QA%20Draft.pdf

Preparation for an Admissibility Hearing: www.swgstain.org/Documents/Legal%20Distribution11082005.pdf

Carolyn Gannett

President's Desk, *cont'd*

The dilemma is that it makes sense to train criminalists with a generalist overview so that they develop a broad view. But who out there is getting this practical general training? The training aspect also seems like an important topic for discussion. Should laboratory management be making an effort to get generalist training to all criminalists before the employee settles into the unit specialty?

Is this too much to ask of today's management? Personally, I hated going from specialization to a generalist approach and was totally stressed out in my early days of California lab work. When the move to specialization finally hit our lab I was greatly relieved but I also realized that over the years I greatly benefited from having had the exposure to other types of evidence analysis. But I initially started right away as a crime scene examiner with only my specialized training. Later I was able to work crime scenes with the broader training and experience I gained due to the generalist environment. I was certainly grateful for that.

Where is the balance?

These are the questions that we need to put on the table:

1) Has ABC watered down the testing process or simply moved to match today's criminalistics environment?
2) Has ABC advanced our professionalism?
3) Has certification helped our criminalists?
4) Should CAC continue to provide support to our member at large for ABC? And should we be asked again in the future for stipends to help pay expenses of test builders, should we pitch in again?

With regards to question 3, one story relates how one criminalist took the test and paid fees for years. Not once was the criminalist ever asked in court about being certified. The criminalist had an opportunity to work with ABC and do some exam building but ABC never took his input. After coming to feel that ABC's only purpose was to collect fees and give tests, he resigned and it took ABC 5 years to remove him from their certified list.

As I stated at the outset of this column, I invite response from the membership so the executive board can get a sense of how the membership expects us to respond. And management needs to take a look at this for the training aspect. I just saw a newly revised training manual for our DNA Unit which is now going to require a formal orientation to all other lab units during the training process. Is this enough? It is more than what we have done in the recent past.

One other thought as I close this column: how can criminalists do crime scene work without the benefit of generalist training? I would postulate that a generalist makes a better crime scene reconstructionist than a specialist. We could evolve to the likes of CSI: Las Vegas or New York where they have a whole team of criminalists at a scene. Is this where we are headed in the future? Department budgets are not going to allow for that. This becomes yet another topic for another day.

But it is clear that the role of certification testing and the role of our current day training are very interrelated. Are they evolving along proper pathways?

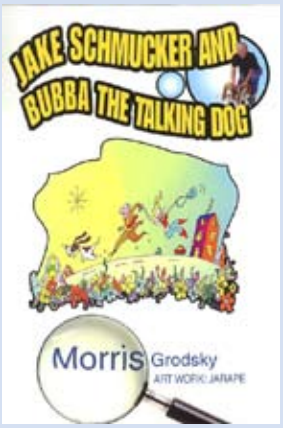
John M. Simms

Forensic Bookshelf

And For Dessert . . .

Review by John Houde

"Jake Schmucker and Bubba the Talking Dog"
By Morris Grodsky
Illustrations by Jarape
Xlibris, Inc.
169pp, ISBN1-4257-2743-3, $17.00



Fiction is not a dream, nor is it guesswork. It is imagining based on facts, and the facts must be accurate or the work of imagining will not stand up.
—Margaret Culkin Banning

Despite it's title, this is not a children's' book. Actually, it's a lighthearted romp through murder, spurned lovers, slimy lawyers, oh, and a technical quirk that allows a very smart pooch to "talk." OK, those scenes are just a stage for our hero (Jake) to show off his considerable forensic chops. Jake is not Columbo, bumping into solutions, but he is unassuming and perhaps a bit tentative; always pleased to accept help from those around him, even canines.

It's great fun to read a work of fiction by an author who has considerable gravitas in the field of criminalistics. Morris Grodsky was a long-time CAC member and the first criminalist in San Mateo, CA. His real-life resume is packed with decades of teaching forensic science to Latin American governments.

Through all of those years he never lost his sense of humor, and here he mixes equal portions of tongue-in-cheek characterizations and actual scientific procedures. The result is a positively Thurber-esque story with unforgettable scenes of improbability. The book is generously illustrated by an acclaimed Colombian caricaturist, Jarape, whose drawings also call James Thurber to mind with their whimsy.

This book is not for the student who only has room on his or her shelf for reference works, but for the criminalist who has daydreamed about being the only forensic scientist on a cruise ship solving a murder with nothing more than his or her own wits.

The Editor's Desk

Strategic Strategies

Not too much longer…

Before too long, there will be another editor guiding the *CACNews*. In the various positions I have had the privilege of serving the Association this has been, by far, the most enjoyable. Thank you all for your contributions and, even more importantly, the time you took to read the best magazine of any forensic association.

Quotable quote…

A friend used to share, "It's a poor frog who won't croak for his own pond." I am not sure where he got it from, but it doesn't matter. Why? Because the *CACNews* is the best magazine of any forensic association!

Beating a dead horse…

You thought I was going to mention something about the *CACNews* again huh? Wrong! Our newest Life Member Bob Blackledge presented me with a gift at the seminar in Temecula – the cardboard bottle holder that contained a six-pack of beer he recently received as a gift. The name – Duke's Dodgerhator!

It's not enough…

A paper was given at the seminar in Temecula addressing the importance of training new employees in ethics in the workplace. Considering the prevalence of situational ethics in our society such training is very important. But, it's not enough. Management has to strive to remove the fear of "one mistake and you're damaged goods" from their laboratories. Such an attitude simply serves as fertilizer for potential ethics problems in any laboratory.

The ISO train…

Considering that the ISO-train is coming down the tracks "like a freight train," I contacted the commissioner's office of the National Football League and let him know. In preparation for this train, he is going to ensure that:

- All measurements on a football field, especially the first down chains, are NIST-traceable.
- Teams desiring artificial grass fields will have to purchase them from an ISO-recognized provider.
- All scales used to weigh players will have annual calibration checks and logs.
- All plays in the playbook will be validated before use.
- For each play that did not work during a game, an investigation will be launched to determine why it did not work. Furthermore, its use will be suspended until the investigation is complete.
- Those responsible for observing players giving urine samples for drug testing will be trained, tested to competency, and annually proficiency tested for their ability to watch someone urinate in a cup.

Don't get complacent…

The firearm and tool marks discipline achieved two recent *Daubert* victories, one of which was in a state in which partial defeat was tasted a couple of times. The most recent decision, *Commonwealth of MA vs. Meeks et al*, is a well-written decision that describes the various elements of the discipline and its validity for use in a courtroom. However, we cannot afford to get complacent because complacency is what created these issues to begin with. Examiners need to continue to be diligent, not only in their casework but also in their communication of what they do, how they do it, and what it means. We cannot go back to the "I know a match when I see it" mentality.

Fond hometown memories…

As I flew down to Temecula, the airline magazine highlighted foods in Buffalo, NY. Considering there are few highlights in Buffalo, I kept that as a souvenir. As I was flying out of Temecula, Buffalo was in the midst of its worst snowstorm in October on record – over two feet of snow. Yet, the very next day there were few no-shows when the Buffalo Sabres met the New York Rangers in Buffalo. Hockey will go on!

Time to get serious…

During the keynote address in Temecula I began to ponder personnel retention in crime laboratories. The speaker talked about the need for more money to encourage people to stay put. This familiar refrain is spoken elsewhere too. "As the importance of DNA lab services continues to grow, the hiring, train-

Ron Nichols
CAC Editorial Secretary

ing, and retention of its experienced analysts is a problem because salaries are significantly higher at other local, state, and federal laboratories [than at FDLE]."[1]

However, what if there is no more money coming down the pipeline? Are we going to continue to avoid the issue or are we actually going to do something about it? If we are truly concerned about something it is imperative that we quit pointing the fingers at people or things we cannot control and start working with what we can control. Considering that teachers have been vastly underpaid for decades (yes, they have summers "off" but they have certification and training requirements – both that they have to pay for – that far off-set that little "benefit") and little has been done to turn that into a more equitable situation, I really don't think we should be looking at the legislature at any level to start fixing our problems for us.

Have you given thought as to how you can help change things? It is important when dealing with some very hard issues that just presenting the issues is not enough. It helps to have a plan that can be part of the solution.

Each of us, no matter our position, has a significant role to play in the morale of a laboratory – and I believe morale is the chief factor affecting retention in any situation. No matter how dire things get, morale keeps people together – working together, fighting together for a common cause and purpose. Even without funding there are strategies that management can take to improve the morale in their laboratories. Even without movement on the part of management, there are strategies that staff members can take to improve the morale – if not for the entire laboratory, then at least for themselves.

If you have not had the opportunity to read it, I recommend "Strategic Human Resource Management in the Forensic Science Laboratory" by Wendy Becker and W. Mark Dale.[2] There are many strategies offered to management that cost little, except maybe to some very egocentric individuals who believe they have all the answers. In their case the cost will be in humility, which in and of itself may be too high a cost to bear.

Among the different strategies they offer are planning strategies, recruitment strategies, and retention strategies. Planning involves realistic estimates of needed staff and cost for that staff. Recruiting strategies involve using realistic job previews, honesty about the hiring process and being proactive in recruitment. Of these I wish to touch upon one – real-

istic job previews. Just as interviewees are trying to make the best impression possible, laboratories too are trying to make the best impression possible, especially when others are seeking to employ the few very well qualified candidates available. Yet, if these best impressions lead to false expectations, who is to blame when the newly-hired candidate walks away to supposedly greener pastures? Part of it has to be laid at the feet of those who created those false expectations.

Retention strategies include preparing a leadership team, assessing job satisfaction, developing team-based systems in the laboratory to assume some traditional management roles, knowing individual career motivations, and monitoring exit interviews to identify patterns causing undesirable turnover. Remember the comment about humility being too high a cost for some? This is where ego can really get in the way of effective leadership.

One way in which these strategies can be implemented, include performance reviews. Management gives performance reviews annually to the staff. How about doing a 180 and getting some feedback from staff on your management skills and what could be done to improve? Better yet, make it anonymous. Another way is to sit down with each employee, assess their career motivation and how it can be accomplished in your laboratory. Then, stick to the plan. Remember, poor planning on your part should not constitute an emergency on someone else's. Finally, you have heard me say this before – scientists typically have good technical skills but lack skills necessary for effectiveness as a manager or leader. That's because we went to school for science and not management. (Don't even get me started about the need for a master's degree in some science to be qualified to lead a laboratory of 50 people.) Form a leadership team and get them leadership skills such as interpersonal relationship development, mentoring, communication, and the like.

Well enough of the management side. How about you as a staff member? How's your morale? Better yet, what are you specifically doing to improve it? While I can empathize with a situation in which management is dictatorial and you seem to be going nowhere, there is nothing that you can do to actually change another person and how they act. So, what are you doing to improve it? Are you going to lunch with the same group of individuals who just feed that attitude by their own constant complaining? Then I would suggest changing who you go to lunch with. Are you one of the ones who consistently complain, vocalizing at every opportunity your discontent? You might want to consider that, "A fool gives full vent to his anger, but a wise man keeps himself under control."[3] You may also wish to consider the plank in your own eye before trying to remove the speck in another's.[4]

Have you given thought as to how you can help change things? It is important when dealing with some very hard issues that just presenting the issues is not enough. It helps to have a plan that can be part of the solution. Even if you are not in a position to change things or to effect change in a situation, you are perfectly free to change your perspective so bitterness does not set in. And it does not have to be a c'est la vie attitude either. Challenges can be recognized as obstacles that stand in your way or they can be seen as opportunities for personal growth. There's a saying around our house. Do not pray for patience because if you do, then you will face challenges that help develop patience within you. When faced with challenges it is sometimes more important to figure out what you can personally learn from that challenge than to try to connive a way around it.

Finally, have you given thought to your ultimate purpose? My wife and I used to teach children about the importance of being a sibling or child. With all of the different DNA combinations you could have been born with you were born with this one. Of all the different times you were born, you were born in this one. Of all the different families you could have been born into you were born into this one. Since neither my wife nor I believe in coincidence, we have to wonder – what is it about us and our potential that we were placed here with our personalities, in this time, and at this place? Have you ever considered that you have come to such a position "for such a time as this"[5]?

You have a unique personality and perspective. You have unique gifts and talents. There is absolutely no one like you. What if it was the unique personality, perspectives, gifts, and talents you alone possess that were ideally suited to your current situation, to help that situation and the others around you? Would you want to miss out on that opportunity? I know I wouldn't.

Would more money from our legislatures be nice? No doubt. However, we have just learned of several ways in which we can improve the situations we are in without any added expenditure. If at least some of these improvements were accomplished, I doubt money would be that big of an issue anyway.

Until next time, my best to you and your families.

Endnotes

1 www.oppaga.state.fl.us/profiles/1061/

2 FBI, Forensic Science Communications, 5(4) October 2003, www.fbi.gov/hq/lab/fsc/backissu/oct2003/2003_10_research01.htm)

3 Holy Bible, New International Version, *Proverbs 29:11.*

4 Holy Bible, New International Version, *Matthew 7:1-5.*

5 Holy Bible, New International Version, *Esther 4:14.*

FEEDBACK FEEDBACK FEEDBACK FEEDBACK FEEDBACK

Editor:

I was reading Raymond Davis' article "The Art of War, [*CACNews* Fourth Quarter, 2006] and was reminded of how I had "lost the advantage" in court, just as Raymond warns. I had been testifying about finding "nucleated squamous epithelial cells" on a rape kit swab and heard a snicker from the jury box. Oops, I instantly realized I'd talked over their heads and they were telling me so through the only avenue open to them. I vowed never again to use terms like that ("live cells" would do) unless prompted for more detail by either attorney. In striving for technical accuracy I had sacrificed understandibility.

John Houde

New Digs for Santa Barbara DOJ Lab

The Santa Barbara Laboratory for the Bureau of Forensic Services has just relocated to a new custom-built facility at 155 David Love Place in Goleta, CA. The analytical instruments and other equipment have been installed and the ten staff members are currently unpacking, testing, and qualifying equipment to provide services in their new location.

The Santa Barbara Bureau of Forensic Services (BFS) Laboratory provides laboratory services and field response to crime scenes, including clandestine drug manufacturing, to San Luis Obispo and Santa Barbara Counties. In addition, the lab also provides response and analysis of illegal drug labs occurring in Ventura County.

Formal dedication of the new facility was held on October 20th, 2006 including an open house with laboratory tours, and a formal dedication ceremony.

History of Santa Barbara Laboratory

The Santa Barbara Laboratory was established in 1972, using federal grant funding to transform the original (centralized) "CI&I lab" into a series of field laboratories throughout the state, called the Investigative Services Branch.

Former BFS Chief, Cecil Hider, opened the original laboratory in downtown Santa Barbara in 1972. In 1974, the laboratory moved into a WWII barracks on the Santa Barbara airport property. The laboratory was housed there for 32 years.

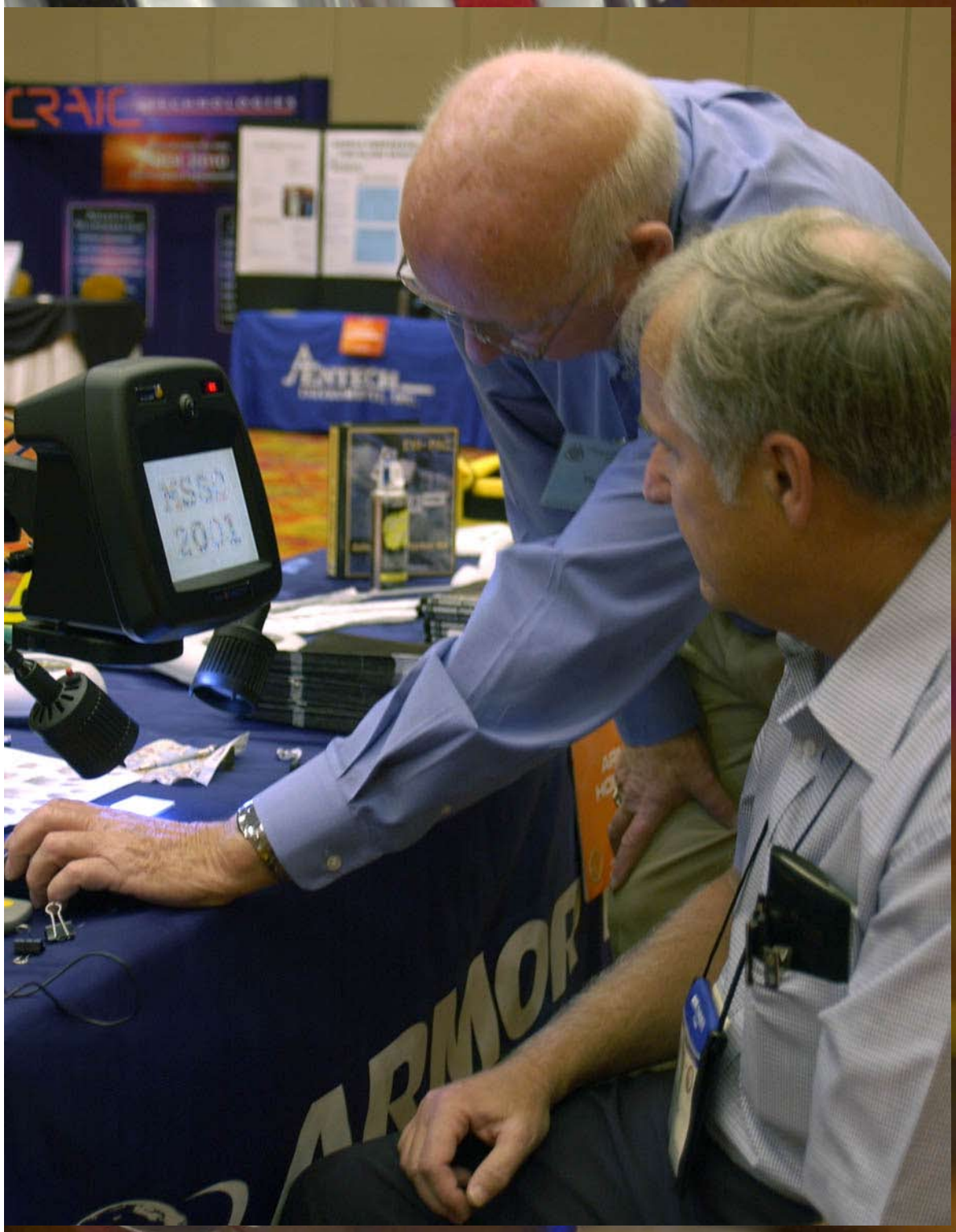
The new Santa Barbara BFS Laboratory facility is modeled after the larger facilities recently built in Fresno, Ripon, and Riverside. The laboratory layout is structured similarly to the recently opened Redding Laboratory. The facility is 13,860 square feet, and sits on a three-quarter acre site. Costs for the construction of this state-of-the-art facility total $7 million.

Amenities at the new facility include an indoor firing range, a horizontal bullet recovery tank, a DNA analysis section (sans DNA analysts), a garage for vehicle examinations, showers, a walk-in freezer, and a walk-in refrigerator.

Submitted by Charlene Marie

Resort Plays Host to 2006 CAC Seminar

Attracting a registrant list of 180 attendees along with dozens of vendors and sponsors, the Fall 2006 seminar got off to a great start at the Pechanga Resort and Casino in Temecula. Workshops included topics as varied as the table games, with soils, paints, DNA and technical writing among the offerings. New technology was discussed along with presentations of historical interest, and you'll find the abstracts included in this very issue of the *NEWS*.

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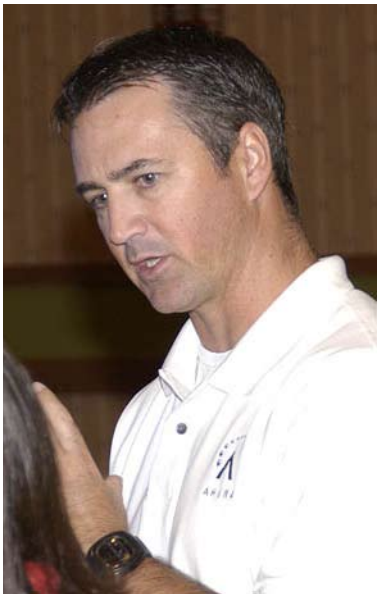


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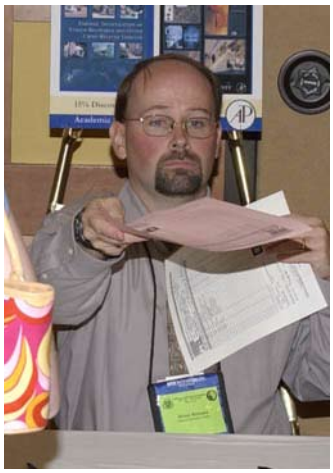
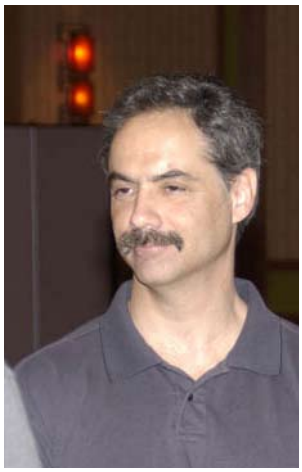




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National Center for Forensic Science

History and Role of the Technical Working Group for Fire and Explosions (TWGFEX)

By Thomas E. Minnich and Lisa M. Windsor

The National Center for Forensic Science (NCFS) was founded on March 17, 1997, when the National Institute of Justice (NIJ) and the University of Central Florida (UCF) in Orlando, entered into a Cooperative Agreement authorizing the creation of the National Center. Legislative initiatives sponsored through the United States House of Representatives Subcommittee on Crime were instrumental in designating the UCF as the site for the National Center. The UCF worked with the staff of the subcommittee to obtain additional federal funding through NIJ for Fiscal Year 1998. This allowed the UCF to proceed with a plan to create a national center asset to enhance the capability of law enforcement professionals to combat crime and terrorism.

Federal legislation set the goal of the NCFS to assist in the fight against crime and terrorism by creating a unique laboratory facility designed and staffed to provide technical assistance to the forensic science and law enforcement communities. The first anti-terrorism effort of the NCFS was the hosting of the National Needs Symposium in August 1997 to bring together fire and explosion professionals from both laboratory and scene specialties. These professionals met to identify problems encountered in the performance of their duties and to propose solutions to these problems. A direct outcome of the Symposium was the formation of the Technical Working Group for Fire and Explosions (TWGFEX).

A major role of the NCFS is sponsoring TWGFEX and fostering the development of national guides for the collection and analysis of fire and explosion debris. TWGFEX committees, along with other experts, have developed guides and NIJ published and distributed them after a widespread consensus review was conducted. The NCFS, with the guidance of its Advisory Board and in cooperation of the NIJ, has taken steps to assist in the distribution of these guides at the federal, state, and local level. The NCFS has provided the law enforcement community with training, research, and tools to effectively improve the quality of fire and explosion investigations.

High on the list of needs fulfilled by the NCFS was the creation and maintenance of an ignitable liquid reference collection (IRLC) for fire debris analysis. As a service to the forensic laboratory community, NCFS created and is maintaining a sample repository of ignitable liquids. Samples of ignitable liquids were obtained from petroleum refiners and distribution centers in the U.S., local stores, and national retail chains. Each sample was characterized instrumentally by gas chromatography and the data placed in a web-accessible, computer database of instrumental pattern data, and is available to the forensic community. When working a suspected arson case, a forensic lab analyst will analyze the fire debris collected at the fire scene. If an ignitable liquid is found, the analyst can attempt to characterize the ignitable liquid using in-house standards and/or reference ignitable liquids or can consult the NCFS-IRLC database. If the ignitable liquid is found in the NCFS-IRLC database, the analyst can request from NCFS that a small sample of the reference liquid be sent to their laboratory to aid in the characterization of the scene sample. Access to the IRLC permits forensic laboratory analysts to characterize the fire scene residues in a more timely and efficient manner and to provide more effective testimony in court.

The NCFS will also support the forensic science and law enforcement communities by conducting fundamental research in forensic science, providing tools to enhance efficiency and effectiveness, and promoting the use of electronic media to access and exchange information. Additionally, it will facilitate the development of quality processes within the forensic science community by identifying laboratory needs, promoting cooperation and exchange between NCFS and the forensic science, law enforcement, academic, government and business communities, and responding to new forms of terrorism with the above mentioned tools and processes. For example, NCFS has partnered with the National Forensic Science Technology Center (NFSTC) in preparing Fire Debris Validation Kits that will be available and free to the community in 2006. NCFS and the NFSTC are part of NIJ's Forensic Resource Network (FRN).

Establishment of the TWGFEX-Scene Section

In February 1999 the TWGFEX-Scene Section was established to meet the needs of the fire/explosion scene investigators. The group at that time also established the mission, goals and structure of the working group. The mission of the group is to establish and maintain nationally accepted programs for the forensic investigation of fire, arson and explosion scenes and devices.

To accomplish this mission, the TWGFEX-Scene Section created four Fire and Explosion Scene committees. These four committees are: Standards and Protocols Committee, Training & Education Committee, Safety Committee, and Job Requirements & Certification Committee. Each committee will be responsible for identifying the needs of the fire and bomb investigative community and recommending strategies in order to meet these needs.

Establishment of the TWGFEX-Laboratory Section

Around the same time, the TWGFEX-Laboratory Section was established to meet the needs of the fire/explosive laboratory analysts. The group at that time also established the mission, goals and structure of the working group. The mission of the group is to establish and maintain nationally accepted guidelines for fire, arson and explosive laboratory analysts.

To accomplish this mission, the TWGFEX-Laboratory created six Laboratory committees. These six committees are: Explosives Standards and Protocols Committee, Explosives Training & Education Committee, Explosives Database Committee, Fire Standards and Protocols Committee, Fire Training & Education Committee, and Fire Ignitable Liquids Database

Committee. Each committee will be responsible for identifying the needs of the fire and explosives laboratory analysts and recommending strategies in order to meet these needs.

Annual TWGFEX Meetings & Symposia

Annual TWGFEX committee meetings, followed by their annual Symposium, have been held in Orlando, FL in November. The committee membership includes federal, state, local and private fire and explosion scene investigators and fire debris and explosives laboratory analysts.

Some of the accomplishments during these meetings are:

• Completed the "Instructor's Training Curriculum Guide for Explosion and Bombing Scene Investigations" which is an adjunct to the National Institute of Justices' (NIJ) A Guide for Explosion and Bombing Scene Investigation, facilitated by NCFS in 1999 and published as a research report by NIJ in 2000. The curriculum guide will be published and made available by the National Center for Forensic Science (NCFS).

• Begin work on creating an "Instructor's Training Curriculum Guide for Fire Scene Investigations" which will be an adjunct to NIJ's research report, Fire and Arson Scene Evidence: A Guide for Public Safety Personnel, also facilitated by NCFS in 1999 and published by NIJ in 2000.

• Reviewed and offered suggestions for a "Fire Dynamics Course for Fire Investigators" that also will be published and made available by the National Center for Forensic Science (NCFS). For more information on the above materials go to www.NCFS.org or www.TWGFEX.org

• Identify all standards, protocols, references and guides that may be employed in the investigation of fires and explosions and also in the analysis of fire debris and explosives evidence.

• Canvass the TWGFEX membership for known existing standards, protocols, references and guides and select identified standards, protocols, references and guides and review them for consistency as a group.

• Review any standards, protocols, etc. that are identified with inconsistencies will be addressed by the committee through appropriate avenues with a view toward resolution.

• Develop a model for Knowledge, Skills and Abilities (KSAs) for both investigators and laboratory analysts in the fire and bomb areas including training guidelines for both.

• Develop and recommend a standardized certification model for maintaining fire and explosive investigators' professional standards.

• Review standards and procedures for safely conducting fire and explosion scene investigations.

• Developed minimum analysis requirements for the identification of intact explosives for explosives analysts.

• Developing minimum analysis requirements for the identification of explosive residues for explosives analysts.

TWGFEX Creates a Unique Forum

As a result of the TWGFEX's Laboratory Fire Section, Laboratory Explosion Section, and the Scene Fire and Explosion Section working together, it is presenting a unique and long overdue opportunity for each of these disciplines to interact and gain knowledge of what is required by each group in order to accomplish their individual missions and more importantly, to develop a working partnership to meet the overall goals and objectives of developing and maintaining nationally accepted programs for the forensic investigation of fires and explosions.

Membership with TWGFEX and attendance of the annual TWGFEX Symposium are strongly encouraged. More information on TWGFEX and their activities can be found at www.TWGFEX.org

Thomas E. Minnich is a Technical Manager for TWGFEX-Scene Section. He has been the Technical Manager for the past six years. Prior to that he was Branch Chief for the Fire Programs Branch of the U.S. Fire Administration. He is a former member of the Pennsylvania State Police where he served as a Deputy Fire Marshal before his retirement. He is a member of various organizations including the IAAI, NAFI and the FOP.

Lisa M. Windsor is a Senior Criminalist for the Tucson Police Department Crime Lab in Arizona. She has been with them for 7 years, with the last 4 years as an Arson & Explosives Analyst. She is a member of various organizations such as AAFS, CAC, IAAI, IABTI, and TWGFEX. She is also on the TWGFEX-Laboratory Section Explosives Training & Education Committee.

Give & *Take*

Out to Lunch

Saks & Koehler Reply to Rudin & Inman's Commentary

Michael J. Saks & Jonathan J. Koehler

At several points in their comment on our article in *Science* (1), Rudin & Inman (2, 3) asserted or clearly implied that we had been dishonest in our presentation. In each of those instances Rudin & Inman's charges are groundless, as we demonstrate below.

Moenssens Quotation

Rudin & Inman wrote:

> We were also intrigued by their quote: "All [forensic science] experts are tempted, many times in their careers, to report positive results when their inquiries come up inconclusive, or indeed, to report a negative result as positive." This quote is attributed to an article by Andre Moenssens (Moenssens, 1993). A quick check with Dr. (*sic*) Moenssens revealed that the author of the quote was actually the late Fred Zain. (Moenssens, 2005) To include such a quote out of context, without revealing its infamous author, seems to us, at best, disingenuous.

Had Rudin & Inman examined the actual source [*see Fig. 1, right*], they would have discovered that the words were indeed those of Moenssens, that they were consistent with the context in which they appeared, that Moenssens was not quoting Zain or anyone else, and that Saks & Koehler had accurately attributed the statement to its author, Andre Moenssens.

"Rearrangement of Data"

Referring to our Table 1, which provides information on the underlying facts in the original trials which later gave rise to DNA exonerations, Rudin & Inman assert that we engaged in "heavy-handed rearrangement of the data" which "would appear to deliberately misrepresent the data." The opposite is true.

Rudin & Inman reach their conclusion by assuming that the count by Scheck and Neufeld is flawless and that any departures from it must be some sort of deception. What actually happened was this: Soon after the book, *Actual Innocence* (4), was published, one of us had occasion to question Neufeld about the data reported in an Appendix to the book. From that conversation it became apparent that the table in the book was imperfect. First, the table reflected double-counting of some cases (violating the principle that any categorization system must be exhaustive and mutually exclusive). Second, there was no sound reason for disaggregating various kinds of forensic science errors into sub-categories while keeping all other sources together in single categories (e.g., eyewitnesses, police, defense lawyers, etc.).

Scheck and Neufeld provided to us a database containing their most complete compilation of facts from the original trials that later led to DNA exonerations. We carefully re-counted the cases annotated as containing (honest) errors by forensic scientists and false or misleading testimony by forensic scientists, to identify a more systematic and accurate list which allowed more direct comparison among the sources of erroneous convictions. We shared the results of that count (along with the database) with several researchers interested in the problem of erroneous convictions, as well as with Scheck and Neufeld. No errors or other mis-steps in our re-count were brought to our attention.

What Rudin & Inman failed to see or did not mention was that, by our count, the total proportion of errors attributable to forensic science *decreased* in comparison with the original count by Scheck & Neufeld.

Six References

In our article we noted that scientists have begun to question some of the core assumptions held by most forensic scientists, and referred readers to six publications. Rudin & Inman comment that, "A quick check reveals that most of the supporting references were written by attorneys, several by the authors themselves." First, neither of us is an attorney. More importantly, as to the six references to which Rudin & Inman refer: five of the six are written by people with scientific education, training, and/or work experience. The one written by an attorney (sans formal scientific education, training, or work experience) contained substantial discussion of important research studies which, like all of the other references, support the statement we made in the article.

We refrain from commenting on numerous other issues and allegations in Rudin & Inman's comment with which we are tempted to take issues. Instead, we close by noting that Rudin & Inman neglected to mention the most significant point they could have made, namely, that at the end of the day they quite agree with us. In their book (5), they wrote: "A community effort is needed to produce a body of empirical work that can support that pragmatic leap of faith to a conclusion of a single common source." It is hard to think of a better one-sentence summary of the essential point of our article.

References

(1) M.J. Saks & J.J. Koehler, The coming paradigm shift in forensic identification science, 309 *Science* 892 (2005).

(2) N. Rudin & K. Inman, The Shifty Paradigm, Part I, *CACNews* 13 (4th Quarter 2005).

(3) N. Rudin & K. Inman, The Shifty Paradigm, Part II, *CACNews* 16 (1st Quarter 2006).

(4) Scheck, Neufeld & Dwyer, *Actual Innocence* (2000).

(5) K. Inman & N. Rudin, *Principles and Practice of Criminalistics* (2000).

crime scenes in *seventeen* cases.[46] Then, when Harding also accused his supervisors, a state police spokesman interviewed on *60 Minutes* admitted that if the supervisors were not directly involved, they were certainly guilty of failing to be aware of what was going on under their noses.

Lapses in honesty are, of course, not confined to crime laboratories. For example, in late 1992, the Richmond, Virginia, newspaper published stories about a private laboratory that is regularly asked to perform thousands of tests on water, air and soil samples for industries, military bases and homeowners to check for a variety of pollutants. These test results were then submitted to state agencies as proof of compliance with environmental regulations. It came to light that this laboratory had either falsified test results or not performed tests and fabricated the results out of thin air. State officials characterized this practice as potentially one of the largest environmental crimes in the state. After state and federal agents raided the laboratory and seized ninety-three boxes of paperwork, and during the weeks of investigation that followed, the laboratory continued as if nothing had happened![47]

Again, we cannot generalize and suspect all forensic scientists of sinister motives. I am convinced that the forensic disciplines are peopled with basically honest and straightforward, competent, experts. But that belief may lull us into a false sense of security. We are of course tempted to say, "it could never happen here" or "our people are not like that." The lawyers, judges, and department heads in all of the above cases probably believed the same thing, until the opposite was established in a court of law. And these are just some of the cases that have come to light.

The temptation to fabricate or to exaggerate certainly exists. All experts are tempted, many times during their careers, to report positive results when their inquiries came up inconclusive, or indeed to report a negative result as positive when all of the other investigative leads seem to point to the same individual. Experts can feel secure in the belief that their indiscretions will probably never come to light. Not all succumb to that temptation; in all likelihood most

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[46] Lischansky is listed in the current membership directory of the prestigious International Association for Identification, the leading professional group of fingerprint experts.

In a news item, a third former member of the same police unit, a lieutenant, was reported to have been sentenced for faking fingerprint evidence. *See Former State Police Official Sentenced in Scheme*, N.Y. TIMES, Sept. 9, 1993, at B8.

[47] Mark Johnson, *Problem at Laboratory Corrected, Lawyer Says*, RICHMOND TIMES-DISPATCH, Dec. 20, 1992, at B11; Alan Cooper, *Man in Lab Case Turns Himself in—Manager is Accused of Falsifying Reports*, RICHMOND TIMES-DISPATCH, Mar. 4, 1993, at B1.

Figure 1.

Norah and Keith Respond to Saks, et al., Rebuttal

Saks and Koehler take issue with several points we raised in our two part commentary (Rudin and Inman, 2005, 2006) on their 2005 article in *Science*.

1. We apologize for the inaccurate representation of Dr. Saks as an attorney. This was perhaps an understandable assumption as he teaches at a law school.

2. Our concern over the rearrangement of data was neither that it was rearranged, nor the final effect on assigned forensic science errors. Rather, it was that Saks and Koehler failed to even mention that it was re-parsed or to tell us the criteria for reassignment. Right or wrong, the initial representation by the Innocence Project is what they reference and their chart is clearly different. Good science, indeed good scholarship of any sort, requires transparency and clarity regarding the methods used to analyze a data set. Especially as this chart forms the core of their thesis, the "protocol" used to form their conclusions for the data should have been detailed. We blame the editors equally for this critical omission.

3. Saks and Koehler are perhaps most upset over our comments regarding the quote from the Moenssens paper. (1993) Hence some clarification is in order. When we initially tried to track down the paper that is the source of the quote, we were unable to locate it, as it was published in a rather obscure journal. In an attempt to locate the paper, we contacted its author, Professor Andre Moenssens. Moenssens himself was unable to provide us a copy of the paper, but recollected the quote and its source. We properly attributed our comments to a personal communication with Professor Moenssens. As the first rumblings of discontent from Saks and Koehler began to surface, we again attempted to locate the original paper, and finally obtained a copy. Although Moenssens did have Fred Zain in mind when he wrote the comment (as evidenced in our personal communication with him), Zain is not formally referenced in the paper. Hence, in the absence of any communication with Moenssens, Saks and Koehler could not have known the source of the comment. Nevertheless, that they would accept and quote without question that ALL experts are tempted to report positive results [our emphasis] says much about Saks and Koehler's lack of familiarity with the discipline and its practitioners. It is telling that, when told of its use by Saks and Koehler, Moenssens commented in an e-mail to us that:

"Upon re-reading it, I would not have included that comment if I had been able to foresee that it would be so taken out of context in order to critique forensic scientists generally. I intended to say that, although innerly having the thought that a "match" probably did exist, the overwhelming majority of folks in our profession, other than a few Zain-types, have no problem resisting the "temptation" (again, a bad choice of words, in retrospect) and would always take the cautious approach by opting for inconclusive. They certainly would never falsely record or change outcomes that their testing had not obtained, as Zain was found to have done repeatedly."[1]

We are happy to provide the entire Moenssens article in PDF format to any reader who is interested.

4. Saks and Koehler are correct that we agree with many, perhaps most, of the points in their paper. As they point out, we have written previously, as well as extensively in the commentary that so upset them, about the need for an interdisciplinary approach to forensic science. However, they should not be so surprised that we (and many of our colleagues) fail to welcome their attempt to redefine a basic precept of the profession. As social scientists, they should be well aware that any discipline is defined by its language and terms. We reiterate that the phrase they created, discernable uniqueness, on which their entire thesis is based, shows a fundamental misunderstanding of the most basic concept in criminalistics, that two items may or may not share a common source. We recommend that, before they suggest a paradigm shift to a profession outside their own expertise, they take the time to study and understand the existing paradigm.

. . . they should not be so surprised that we (and many of our colleagues) fail to welcome their attempt to redefine a basic precept of the profession. As social scientists, they should be well aware that any discipline is defined by its language and terms.

5. We submit here that if a paradigm shift is occurring, it is in the field of law, where ever more attorneys are questioning the foundations of the forensic science disciplines and the quality of the work product of the laboratory. This, as we have commented many times, is a good thing. The challenge to forensic science is to live up to the promise of introducing sound science into courts of law, rejecting that which is expedient, crafted, biased, or speculative. Other times and other forums are required for that discussion, but it should include a wide variety of participants and stakeholders.

[1] Reproduced with permission

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Proceedings
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Plant Poaching

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The theft and trade in endangered, exotic, and commercially valuable plants is a huge national and international problem. The international forensic science community needs to become aware of this problem and to exert their expertise towards the prevention of plant poaching and to provide means of detection and identification of poached plants so that violators may be successfully prosecuted. The audience will be told of the scope of this problem, illustrated by a few specific cases. They will also be made aware of the applicable major international/national conventions and statuettes, and the elements of the crime that must be proved if prosecution is to be successful. Specifically of interest to criminalists, the talk will conclude with marking/detection/identification methods that have led to successful prosecutions, and offer hints of future approaches.

Tales from the Crypt - Was the 'Rostov Ripper' a Human Chimera?

Kimberly Alexandra Barron, MFS (National University) and Bob Blackledge, NCIS San Diego Lab., retired.

Andrei Chikatilo (aka the 'Rostov Ripper') was Russia's most prolific serial killer. During a reign of terror spanning 12 years he raped and killed over 50 victims. Early in the investigation Chikatilo became a person of interest, but was discounted when his blood type came up as type A (in the ABO system) while seminal fluid samples found in several of the victims were type AB. When finally caught in the act, Chikatilo not only confessed, he led investigators to bodies that had not as yet been discovered. At his trial the head of the serology section at the crime laboratory in Moscow explained the apparent discrepancy by saying that Chikatilo "was an example of an extremely rare, newly-discovered phenomenon" that she called "'paradoxical secretion', in which an individual has blood of one type and secretions of another." While researching for his book, The Killer Department, [ISBN 0-679-42276-5] that details the investigation in this case, Robert Cullen interviewed Special Agent David Bigbee, who was then Chief of the DNA Section in the FBI Lab. We don't know if Bigbee was quoted correctly or out of context, but according to Cullen he flatly stated "paradoxical secretion does not exist!" [page 244] - - - Well, Hello? - - A well-known and highly-respected reference, Race and Sanger's Blood Groups In Man, 6th edition, 1975, on page 519 quotes a definition from a previous work (1951): 'In the current embryological (which is also the classical) sense, a "chimera" is an organism whose cells derive from two or more distinct zygote lineages, and this is the sense which the term "genetical chimera" is here intended to convey.' They go on to list twenty verified cases of "TWIN CHIMERAS" [Chapter 26, Blood Groups In Twins And Chimeras, relevant pages are 519-528]. This talk will discuss this case and attempt to explain the phenomenon of "human chimeras" in a way that (although totally boring to DNA mavens) will make some sense to firearms and toolmarks examiners, blood alcohol examiners, drug chemists, and trace evidence specialists. [Sorry, our communication skills are inadequate for those at supervisory or higher levels.]

The Use and Presentation of Forensic Evidence in Trial

Giacomo W. Bucci, Deputy District Attorney San Diego County District Attorney's Office

With the advent of the television franchise of CSI, forensic evidence has been thrust into the forefront by the average citizen and potential jurors. This presentation will discuss how various fields in forensic science were used to present evidence in a double homicide recently tried in the North County Branch of San Diego County. The discussion will focus on the interaction between the prosecutor and Criminalist involved in the analysis of the evidence. It will deal with pre trial and trial issues and how the parties prepare for both. The various areas included in the discussion are soil evidence, handwriting analysis, fiber evidence and DNA, to name a few.

Unwitting Defaulters and Well-Meaning Usurpers—The Creation and Exploitation of Deficiencies at Both Ends of the Physical Evidence Continuum

Peter R. De Forest, Professor of Criminalistics, John Jay College of Criminal Justice and Robert Blackledge, ret., NCIS Regional Forensic Laboratory

Criminalistics, properly practiced, is a challenging and a profoundly intellectual endeavor. Unfortunately, it is not always viewed this way by those who hold the title Criminalist. Compounding the problem further is the fact that some criminalists are constrained from practicing criminalistics the way it should be practiced. The reality of practice can depart from the ideal markedly. One primary area of concern is the front-end assessment of the physical evidence in a case. This is the beginning of the physical evidence continuum. The

front-end assessment should take place at the crime scene by an experienced scientist. It is equally important that senior criminalists interpret the total physical evidence picture at the other end of the continuum - the back end - at the point where the case is being prepared for adjudication. Failure to attend to these needs creates deficiencies by default. These defaults provide opportunities for non-scientist "usurpers" to fill the void. In most cases these are well-meaning investigators and attorneys who are performing a necessary function that is left unaddressed by criminalists. Someone must recognize the evidence at a crime scene and define the physical evidence problem for the laboratory. At the other end of the continuum there is a need for someone to interpret the totality of the physical evidence for the court. These functions, those at both ends of the continuum are at least as challenging as the analysis of the evidence in the laboratory and are best performed by scientists who understand physical evidence - viz., experienced criminalists.

The challenges of crime scene work are not widely appreciated. Investigators don't normally have the fundamental understanding of the laws of nature normally possessed by scientists to assist them with insights into the production of physical evidence. Such knowledge combined with experience with hypothesis development and testing is an important aid in evidence recognition. Extensive knowledge of how physical evidence is analyzed in the laboratory is needed at the scene as well. Non-scientist scene investigators need to work with experienced scientists at the scene. Teamwork in which the criminalist plays a prominent role is essential.

Once all of the properly recognized physical evidence in a case has been analyzed in the laboratory, there is a need to interpret it in the context of the issues in the case. In many situations this is far from straightforward. It requires scientific dispassion, a broad scientific background, and extensive experience in criminalistics. This should not be left to the prosecuting attorney by default. In more complex cases the interpretation is tantamount to a reconstruction. This calls for experience and skill with hypothesis development, with the evaluation of alternate hypotheses, and with experimental design. Like the situation on the front-end of the continuum, the work on this end of the physical evidence continuum is scientifically challenging. The most experienced criminalists are necessary for meeting these needs. Attorneys need to recognize this and not go it alone.

In many settings, this is not the way things are done. The profession must work to bring about change, but the road ahead is not an easy one.

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DNA Analysis of Natural Fiber Rope

Mignon Dunbar, Murphy Laboratory, Forensic Science Program University of California Davis

When rope is found at a crime scene, the type of fiber is currently identified using microscopic characteristics. However, these characteristics may not always distinguish some types of rope from others. If rope samples contain cells from the plants of origin, then DNA analysis may prove to be a better way to identify the type of rope obtained from a crime scene.

The purpose of this project is to develop techniques to use DNA analysis to differentiate between ropes made from flax, sisal, abaca, hemp, and jute. The procedures include extracting the DNA from the rope, performing PCR using the extracted DNA as template, and analyzing the DNA products. A primer pair was chosen to be specific to plants -designed from within the chloroplast gene for the large subunit of ribulose bisphosphate carboxylase. The primer sequences were chosen to be complementary to the genes from all five plants, yielding a fragment of approximately 771 base pairs.

Since the resulting PCR fragments from each of the five plants are the same size, they can either be distinguished by determining their nucleotide sequence or through restriction analysis.

The Daryl Tavie Case

Linda Dunn, Supervising Deputy District Attorney, Riverside County District Attorney's Office and Rick Cobb, Detective Riverside Police Department

Daryl Tavie was convicted in 1986 of two counts of forcible rape, two counts of assault with intent to commit rape, and 3 counts of robbery by force. All the victims were women who did not know him; three of them were abducted from the bus station in downtown Riverside, and one, a 15 year old, was abducted as she walked to school. All four were taken to a remote location, where he robbed them, tried to rape them, and succeeded twice. The 15 year old girl got away by running through the orange groves, and another victim who had her infant with her, took the baby and ran naked from Tavie, before he raped her. Tavie served 11 years for these crimes.

He was released on parole in 1997. A 17 year old girl, not enrolled in school, was hanging out at the Riverside bus station where she met Tavie on the day in October 1997 he took her by the hand, dragged her into an alley, and raped her, stealing $7 from her as he ran away. She reported it immediately and told police she did not know the rapist. Police did a minimal investigation, but did take the girl to a hospital where a rape exam was conducted and semen found. The case languished for six years.

In 2001, Tavie returned to prison on a forgery. His blood

sample was taken as he was a convicted rapist. In 2003, a criminalist working on CODIS matched the 1997 Riverside case to Tavie's DNA profile. RPD Detective Rick Cobb was contacted. He located the victim, who remained cooperative, and Cobb traveled to Corcoran prison to obtain a confirmatory blood sample from Tavie and interview him. Tavie denied the rape and said there was no sexual contact. . When told that his DNA had been confirmed, he changed his story to "we had sex, but she was a hooker". He eventually admitted she might have said "No, stop" a few times. He admitted that he might have also taken a few dollars from her.

In August 2004 the case went to trial, the first Riverside County "Cold Case" DNA trial. The victim testified. The original patrol officer from RPD had been fired for misconduct. He testified for the defense. Three of the 1986 victims testified. Det. Cobb testified. A criminalist from the Richmond Lab testified. After 2 days of deliberations, the jury found Tavie guilty of kidnap for rape, and rape. When he was sentenced in September 2004, he received 110 years to life.

Unusual Results at DNA Loci on the X and Y Chromosomes

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Samples analyzed by the San Diego Police Department crime lab have given unusual results at Amelogenin and using Y-STRs. This paper highlights a couple of examples, the possible causes for these and other unusual results, and their implications in casework analysis.

Evaluation and Application of Polynomial Texture Mapping (PTM) in the area of Shoe/Tire Impression Evidence

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The goal of this NIJ funded project was the development and implementation of a more useful tool in evaluating impression evidence such as shoe and tire impressions left at the scene of crimes. Hewlett-Packard Research Laboratories developed the Polynomial Texture Mapping (PTM) software that has been successfully used in a variety of applications such as hieroglyphic relief imaging. The use of the PTM technology has the potential for better resolved images of impressions left at scenes of violent crimes. These images can improve the comparison of known shoe soles or tire treads to impressions left at crime scenes. This PTM project explored the use of the PTM technology in forensic impression evidence and developed a portable unit for field use. The research evaluated the usefulness of the PTM technique for footwear and tire impressions by comparing them to conventional oblique light and casting techniques. This technology in the forensic field could significantly improve the quality of impression images leading to more definitive information from scene evidence.

A laboratory-based PTM dome and a portable dome were constructed and applied to various types of impression evidence. Test impressions were made in soil, mud, and blood with three types of footwear. The impression evidence documented by the PTM technology can improve the comparisons and identifications of shoes/tires to impressions left at crime scenes. An added benefit is the time reduction in the capturing and comparing of impressions.

The research also included the evaluation of different digital cameras for resolution, which is critical for viewing the unique detail in impression comparisons.

Pattern Recognition Procedures for the Classification and Prediction of Stains Originating from Wax-Based Products

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In the absence of reference materials, a forensic scientist is sometimes asked to determine the origin of stains suspected to be of wax-based products. Common approaches are either to perform direct comparisons of the suspected stains with a number of known stains, or to determine the presence of compounds commonly associated with wax-based products (e.g. methyl esters after trans-esterification of oil and fatty substances). These approaches, although suitable for small numbers of samples, is subject to the knowledge and experience of the forensic scientist. Furthermore, techniques such as transesterification are tedious to perform. Additionally there are a variety of wax-based products with closely similar compositions that are difficult for a forensic scientist to distinguish. Therefore, two pattern recognition procedures i.e. chemometrics and artificial neural networks (ANNs) were studied as a means for distinguishing between closely similar wax-based products and for removing the subjectivity involved in the comparisons of such products.

In this study, three types of wax-based products: lipstick, lip balm, and shoe polish were examined. The features used for their classification were Gas Chromatographic (GC) profiles and Ultraviolet-Visible (UV-Vis) spectra. The chemometrics procedures used were Principal Component Analysis (PCA) and Hierarchical Cluster Analysis (HCA). The ANNs were Multi Layer Perceptron (MLP) and Kohonen artificial neural network (Kohonen-ANN). It was found that, with the chemometrics procedures, no neat grouping or clustering of the wax-based products was achieved. On the other hand, good classifications of the wax-based products were achieved by both of the ANN methods. The GC profiles resulted in better classification using the ANN methods than the UV-Vis spectral data.

Other than classification, it is also possible to develop with the ANNs, an automated predictive system to reliably determine the origin of unknown stains suspected to have originated from wax-based products. The predictive ability of both the ANN procedures i.e. MLP and Kohonen-ANN

was tested by introducing to the networks six independent unknown stains, which were not used in the training of the networks. It was found that networks trained with the GC profiles gave slightly poorer prediction outcomes of the class membership of the unknown stains compared to networks trained with the UV-Vis spectra. In order to resolve this, it was decided to combine both classification features. With this combination, it was possible to create networks having both good classification and good prediction outcomes.

Of the two ANN procedures studied, MLP is superior to Kohonen-ANN in terms of ease of use, time taken for training, selection of suitable networks, classification rate and prediction outcomes. However with Kohonen-ANN, the relationship between samples under study can be easily visualised by mean of two-dimensional topological map display.

This study shows the applicability of pattern recognition procedures especially ANNs to forensic chemistry. If a case such as described above is encountered in casework, the analysis and interpretation of findings will not be entirely dependent upon the knowledge and experience of the analyst involved. In essence, ANNs can be used to capture the knowledge and experience of the forensic scientist and remove subjective human judgment from the interpretation of the outcomes.

ISO: Get On Board

P. Michael Kellett, ASCLD/LAB Staff Inspector

One of the early committees appointed by the American Society of Crime Laboratory Directors (ASCLD) was the Committee on Laboratory Evaluation and Standards. Members of that committee were Tony Longhetti, Jack Cadman, George Ishi, Carlos Rabren, Travis Owen and Ralph Keaton. The committee was chaired by George Ishii, Tony Longhetti and Jack Cadman at various times. For approximately four years, the committee considered and worked on various programs that could be used to evaluate and improve the quality of laboratory operations. The committee considered individual certification, a self-assessment program and an accreditation program based on external peer review as a possible means of achieving the goal. The committee's efforts resulted in the formation of the ASCLD Laboratory Accreditation Board (ASCLD/LAB) in 1981. In May 1982 the eight laboratories of the Illinois State Police became the first laboratories accredited by ASCLD/LAB. In November 1984, ASCLD/LAB Chair, Thomas Nasser, sent a notice to all Delegate Assembly members that the Delegate Assembly would meet for the first time in September 1985.

In 2003 the Delegate Assembly approved the implementation of a dual-track accreditation program. In addition to the ongoing accreditation program which is now referred to as the Legacy Program, ASCLD/LAB initiated the ASCLD/LAB-International Accreditation Program which is based on the ISO 17025 Standard and ASCLD/LAB Supplemental Requirements. This presentation is an overview of the ASCLD/LAB-International Accreditation Program. Some similarities and differences between the Legacy and International programs will be identified.

CARNAGE IN GOLETA: A Shooting Rampage at the Goleta Postal Dist. Center. How Do We Respond to Large Scenes?

Meghan Kinney, Senior Criminalist, California Department of Justice Freedom Laboratory, and Charlene Marie, Assistant Laboratory Director, California Department of Justice Santa Barbara Lab.

It was reported in the news media that on Monday evening, January 30th, 2006, employees at the Postal Distribution Center in Goleta called 911, still unsure whether ex-employee Jennifer Sanmarco was lurking, hidden in the cavernous building and ready to shoot as they dialed. "OK, ah, ahh, this is the post office on Glen Annie," a postal employee named Tom told a sheriff's emergency dispatcher.

On Monday evening, January 30th, 2006, local broadcasting was interrupted to announce that shots had been fired at the local postal distribution center. Residents were cautioned that the shooter was still at large. Police and other emergency responders arrived at the scene to find two females dead in the distribution center parking lot and another female dead just outside the employee entrance to the building. The identity of the shooter was not determined until early the next morning. The shooter, Jennifer Sanmarco - a former employee, shot two more employees inside the facility and then killed herself.

The Goleta Postal Distribution Center is a sorting facility for the US Postal Service. It is about 230,00 square feet (about 2 1/2 times the size of a Costco). It operates on a 24-hour basis and employees about 320 people. It is arranged in aisles and the sorting machines make the facility very noisy.

We will focus on how we responded to and handled this emerging, exigent scene. We will walk you through the events of that night and discuss the decisions made as events unfolded. We will tell you about the Bureau of Forensic Services Special Response Team (SRT).

The SRT is made up of individuals from the field laboratories around the state. These individuals are comprised of senior employees with a wealth of crime scene experience. Each person brings his or her own unique experience to the scene. The team responds to complex homicides and officer-involved shootings anywhere in California.

Finally, we will emphasize the importance of ongoing communication, training and relationship with our client agencies. Good working relationships with our client agencies need to be in place so that when a critical incident occurs we are ready to work with them and to respond effectively.

The Forensic Examination of Documents Produced by Office Machine Systems Utilizing Inkjet Technology

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This presentation is designed to provide a discussion of

some modern approaches to the physical and chemical examination of documents produced by inkjet printers and copiers. With the advent of this technology, there has been tremendous popularity amongst criminals to use printers to commit a variety of crimes such as sending anonymous letters (e.g. threatening, kidnapping, and extortion), counterfeiting, producing child pornographic images, and creating other types of fraudulent documents. In some instances, legitimate transactions such as contracts and wills later become the focus of a criminal investigation. This may cause a suspect(s) to alter entries, generate new documents in an attempt to substantiate their case, or make false claims regarding the questioned document.

Forensic document examiners can perform a variety of examinations that may help link multiple documents with each other or a suspect printer(s), ascertain if the document is legitimate with respect to date, or determine the make and model of the suspect machine. The objective of this presentation is to emphasize the importance of conducting examinations using microscopy, the video spectral comparator (VSC), an electrostatic detection device (EDD), and/or thin layer chromatography (TLC). As well, some new ideas will be proposed with the intention of providing forensic document examiners insight into the future of inkjet analyses. These will include instrumental methods such as spectrophotometry and the use of imaging analysis equipment.

The Use of Morphology, Micrometry, and Mass to Brand Identify Reloading Smokeless Powders in Improvised Explosive Devices

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In the late 1800's, smokeless powder was developed as a substitute for black powder used in small arms. At the close of World War II, the United States government had a surplus of smokeless powder. Several private companies purchased the surplus smokeless powder for the reloading market. Over the years, brands that were popular continued in production, older powders retired, and new powders developed to fill in the gaps of cartridge reloading. The availability of smokeless powder and its relatively inexpensive cost have led to its use as the explosive in improvised explosive devices such as pipe bombs. Situations arise where sufficient kernels of smokeless powder remain allowing the analyst to provide brand identification or a short list of possible brands of powders.

Providing single brand or a short list of brands of possible smokeless powder used as the explosive in a pipe bomb to an investigator may be helpful information in both the investigative and adjudicative phases of the investigation. In this study 148 smokeless powders were examined for their macroscopic and microscopic morphology, micrometry, and mass. The measurements were subjected to Bonferoni-Dunn statistical analysis, which permits one-against-many comparisons.

Many brands were distinguishable after the morphology and micrometry, while others required mass determination to assist in the reduction of possible brands. A few powders were not distinguishable to the single brand by these methods and use of instrumental analysis (not part of this presentation) may help to further isolate the brand or a short list of possible brands would be provided to the investigator at the conclusion of this analysis.

Isolation of Methamphetamine From Cyclohexadienyl-2-methylaminopropane via Potassium Permanganate

Fracia S. Martinez and Daniel M. Roesch, Forensic Chemist, Drug Enforcement Administration, Southwest Laboratory, Vista, CA

One of the main methods of manufacturing methamphetamine is the reduction of ephedrine or psuedoephedrine utilizing an alkali metal such as lithium or sodium, and liquid ammonia. This method is often referred to as the Birch-Benkeser reduction method or more commonly, as the "Nazi" method. The hydroxyl group of (pseudo)ephedrine is more reactive than the aromatic ring, but with excess alkali metal and the presence of an added proton source a cyclohexadiene, Birch-type, product is formed. This substance is known as cyclohexadienyl-2-methylaminopropane, or more simply - the Birch product. The ratio of the Birch product relative to methamphetamine is occasionally very high in the final product and can create an undesirable, mixed infra-red spectrum. Separation and isolation of the methamphetamine in this mixture can be achieved however by oxidizing the Birch product using potassium permanganate which is a good oxidizing agent for alkenes. By applying this technique with a basic aqueous/hexane extraction the methamphetamine passes to the organic fraction where it is isolated by precipitation as hydrochloride salt form. The final product is then sufficiently pure to enable confirmatory analysis via infrared spectroscopy.

Clandestine Drug Manufacture with Style, an Unusual Underground Methamphetamine Lab

Nessa Rosenbaum, Criminalist, San Bernardino Co. Sheriff's Dept., Scientific Investigations Division, 200 South Lena Road, San Bernardino, CA 92415, SID-CSI2@sbcsd.org

Recently, an illicit methamphetamine-manufacturing lab was found underground at a home in Fontana, California. A case history will be presented including the information, which led to the discovery of the lab, the processing of the crime scene as well as a Power Point presentation of pertinent photographs of the scene and results of the analysis of the evidence samples collected.

Clandestine methamphetamine labs used to be a dime a dozen in San Bernardino County. Although there has been a substantial decrease in recent numbers of such labs, we do still see them on a routine basis. One of the more interesting labs encountered was found through an informant in Fon-

tana, California. Sheriff's narcotics deputies confirmed the presence of the lab by utilizing a code enforcement agent. Apparently the suspect had built an addition to his home without obtaining the appropriate permits. The code enforcement agent reported the results of his inspection to Sheriff's narcotics deputies. This gave them probable cause to conduct a search. The room addition had been demolished by the time the deputies conducted their search. However, they were able to discover a section of the cement foundation that could be lowered via a homemade hydraulic lift (elevator). This section had originally been underneath the tile floor of the shower in the bathroom portion of the above ground home addition. An underground room, complete with painted walls, marble tiled staircase and floor, fireplace, toilet, sink, credenza, television, refrigerator, and ceiling fan, was found upon descending on the lift.

Everything needed for a medium sized clandestine methamphetamine lab was also found inside the room from glassware, heating elements, filters, scale, tubing, etc. to all the chemicals required to manufacture methamphetamine. Approximately 100 pounds of iodine and 20 pounds of used red phosphorous were discovered along with tablet and powder precursor (ephedrine/pseudoephedrine), and almost one and a half pounds of finished product (methamphetamine). The method of manufacture was the red phosphorous, hydriodic acid reduction of ephedrine/pseudoephedrine.

The Thornton-Snyder Case

Michael Rushton, Chief Deputy District Attorney, Riverside County District Attorney's Office

On April 17, 2001, at 4:00 PM, Diane Lindholm returned home to her multi-acre Rubidoux horse property after a long day of school. When she drove up to the entry gate of her property, she found that the chain to her gate had been cut, and she sensed that intruders were on her property. She was right. At the very moment that Lindholm drove up to her gate, three people were in the tack room located not more than 60 yards from Lindholm's front gate. The intruders included Michael Thornton, age 46, Janeen Snyder, age 21, and a victim that they had kidnapped 14 days earlier in Las Vegas, Nevada, Michelle Curran, age 16. Thornton and Snyder were lovers, but more than that they were self-proclaimed partners that specialized in abducting and sexually exploiting teenage girls. At the very moment that Lindholm arrived home, Thornton and Snyder were armed with firearms and in the process of sexually assaulting their 16-year-old kidnap victim. They had torn Michelle's clothing from her body, bound her with duct tape and zip ties, attached ligatures to all four limbs and strung her nude body from the rafters of the tack room. In the privacy of this environment, they tortured and sexually abused Michelle. Due to the noise of Lindholm's diesel pickup truck, Thornton and Snyder knew they had been caught in the act. In an apparent effort to facilitate their escape, Snyder shot Michelle in the center of the forehead from close range and Thornton hid the body in the locker on a nearby horse trailer. Moments after the shot was fired, Lindholm entered into her residence and called 911. Thornton and Snyder fled Lindholm's property in their Suburban, made a few wrong turns and ended up in a cul-de-sac two miles from the scene of the crime. Responding sheriff's deputies captured Thornton and Snyder after they abandoned their vehicle and fled on foot.

The subsequent investigation would expose Thornton and Snyder for what they were: violent sexual deviants with an unquenchable thirst for teenage girls. Over the years, they had developed a tried and true plan to capture and cultivate their teenage victims. Snyder had become entangled with Thornton when she was only 14 years old. Now, at age 21, this attractive and petite female could have easily passed as a high school junior. Thornton exploited Snyder's youthful appearance and used her as the bait to lure in their young victims. After the victims had been trapped, Snyder then became the groomer and conditioner, training the victims both socially and sexually. The investigation would reveal that in 1996, using this plan, Thornton and Snyder abducted, raped and murdered their first victim, a beautiful high school freshman by the name of Jessie Peters. Many other victims would emerge, culminating in the discovery that Thornton and Snyder had used this plan to exploit three separate girls during the 14 months preceding their arrest.

The trial of the couple started in December 2005. It would last six months. After the prosecution had called 129 witnesses and introduced more than 1,000 exhibits, the matter went to the jury. On May 24, 2006, the jury returned death verdicts against both defendants.

Significance Assessment of Paint Transfers Using the PDQ Automotive Paint Database

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There is currently a Federal agency focus on finding ways to improve communication of the significance of trace evidence conclusions to the courts. A simple "could have originated from the same source" opinion is simply lacking in guidance in their mind, without some attempt to quantify the significance of the association. Of course, this is something practitioners have struggled with for years. Unfortunately, in materials analysis the relevant population is always changing and it is not unusual to find correlations between comparison characteristics.

One approach in attempting to quantify the value of an association is to access reference collections or data bases to generate frequency of occurrence values. Of course, the representative nature of these collections is always of concern. The Paint Data Query (PDQ) international automotive paint data base/reference collection is one such source of frequency information. It can be of value in attempting to assess and communicate the evidential significance of corresponding original finish automotive paint samples in a trace evidence

transfer case. One such example will be presented, involving an eight-month-old "cold" hit-and-run case that occurred several years ago in a city on the east coast of Florida. The suspect vehicle was a 1977 GMC van recovered from a salvage yard. Although there was some other associative evidence, the paint evidence was quite compelling.

Frequency of occurrence data is not an end in itself, merely one step in an attempt to convey either the unique or common nature of the transferred material.

Teaching and Training on Ethics in the Workplace

John Simms, Supervising Criminalist, San Diego Police Department Crime Laboratory, 1401 Broadway MS 725, San Diego, CA 92101, jsimms@pd.sandiego.gov

Traditional on-the-job training for new employees has always included the obvious technical skills development to allow the trainees to progress to a level of doing honest casework. There was a small dose perhaps of a lab orientation, and maybe some safety issues included in the orientation; however, accreditation has made us look more closely at this "in-the-door" training and its content. Our new employee training program involves very formal Quality Assurance training broken out into several blocks. Ethics is woven into this training as a part of the policy review, explaining the layers of accountability and responsibilities that start within the unit and work outwards to general lab and department, and then city regulations. The training finishes with a PowerPoint presentation on WHEN THINGS GO WRONG that presents real cases of wrongdoing and carefully lays out the differences between malfeasance and honest technical errors.

Status of the Trace Evidence Resource Center at the Sacramento Forensic Service Laboratory

Faye Springer, Criminalist, Sacramento County District Attorney Laboratory

In 2001, the State of California authorized money for the Local Forensic Laboratory Improvement Program (LFLIP). The Sacramento Forensic Services Laboratory used a portion of this grant to augment instrumentation in the trace evidence laboratory. Justification for this augmentation was to improve trace evidence resources to not only Sacramento County but to other laboratories that may not otherwise have these resources available for case work. The Sacramento Laboratory purchased, installed, and validated the following instrumentation for use in forensic case work. Raman Microspectrophotometry, Scanning Electron Microscope with Energy Dispersive Spectrometry, Ultra Violet/Visible Microspectrophotometry, Laser Ablasion / Inductively Coupled Plasma/ Mass Spectrophotometer, High Pressure Liquid Chromatography/ Mass Spectrometry with UV/Vis Spectrophotometer.

I will discuss cases that have been completed at this time and the status of the fee-for-service for use of this instrumentation for casework outside of Sacramento County.

Soil as Evidence in a Southern Calif. Forensic Case and the Development of a Searchable Soil Profile Database

Marianne Stam, Senior Criminalist, California Department of Justice Riverside Laboratory, Marianne.stam@doj.ca.gov

Few California crime laboratories have analysts who are proficient in forensic soil analyses largely due to the perception that soil casework is too difficult, time consuming and provides little valuable information for the time spent to work the cases. Consequently, few attempt even the most rudimentary examinations and soils are often not collected or considered as valuable evidence at crime scenes.

This paper illustrates a Southern California soils case in which a detailed forensic soil profile database would have been useful in adding significance to the analytical results, and discusses the development of a searchable soil profile database that would make soil evidence more valuable as an investigative tool.

In the soils case, a suspect in San Diego County, California murdered two female acquaintances and buried them within 5 miles of each other in northern San Diego County. One victim was buried along a creek bed; and the other was buried in a citrus grove adjacent to a landscaped park. Investigators collected two shovels and a hoe from the suspect's garage. Soil from the shovels and hoe were examined and compared to soil from the two burial sites using basic analytical methods available in most crime laboratories. The soil on the shovels was similar to the soil from the citrus grove site, and dissimilar to the soil from the creek bed. The soil on the hoe was dissimilar to both burial sites.

The region where the burials were located is part of an extensive geomorphic province called the "Peninsular Range Batholith". This batholith includes granites, granodiorites, and gabbros, Mesozoic metasedimentary rocks, and Quaternary alluvial deposits. Results of the soil analyses on the shovels and at the citrus grove site showed the presence of quartz, plagioclase feldspars, alkali feldspars, a few zircons, biotite, hornblende, and a few pyroxenes; all quite common to batholithic environments. Consequently, although the soils on the shovels and at the citrus grove site were similar, the extent of the batholithic rocks, the lack of a detailed soil profile database, and the lack of better discriminatory analytical methods made it impossible to attach significance to this "match".

To improve the discriminatory abilities in California forensic soil cases, a University of California Soil Mineralogist was contacted about the idea of developing a searchable forensic soils database that would involve not only using the basic methods of soil analyses as discussed in the San Diego County case, but also more advanced analytical techniques, such as SEM/EDX. The concept and development of such a database will be discussed.

Issues Facing Graduate Forensic Science Programs and their Impact on the Criminalistics Laboratory

Frederic A. Tulleners, Director, Forensic Science Graduate Program, UC Davis, 1333 Research Park Drive, Davis, CA 95618

This presentation will discuss some of the administrative and educational issues facing graduate forensic science programs, their impact on the crime lab and on the graduate student. In particular we will focus on some of the decisions faced by the graduate forensic program such as the one at UC Davis and the rational for those decisions. The choices are a job specific or trade craft type training versus a fundamen-

tal concept type training followed by self directed research, FEPAC accreditation etc. We will also discuss the impact graduate education has on the hiring and retention of the future crime lab employee. With the increasing visibility and need for competent forensic science there has been a dramatic change in the candidate selection pool available to the criminalistics laboratories. Surveys conducted in Australia also point to the need for a certain class of undergraduate degrees. A look at the current profile of graduate student population will tell us the current area of interests and what the criminalistics labs will look like in the year 2020.

Mineral Identification Using Infrared Microprobe Analysis with Diamond Attenuated Total Reflection

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Mineral identification has been used by criminalists to aid in investigations since the beginning of the 20th century. Minerals can be employed as physical evidence in both criminal and civil matters, principally in reference to soil analysis. Mineral evidence can be used in several ways, with the two primary applications by a criminalist being the comparison of a known sample from evidence with a suspect's sample and the identification of the origin of a questioned sample. Despite the significance that this evidence can have on a case, soil and mineral analysis is underused and underappreciated in the forensic science community. This is due to a variety of reasons stemming from the challenging nature of traditional mineral identification methods to the interpretation of complex mixtures. Modern infrared microprobe methods combining microscopy and infrared spectroscopy changed this, making it possible to analyze and identify mineral samples quickly and consistently.

Infrared microprobe analysis of minerals is made possible through the use of the diamond attenuated total reflection (ATR) microscope objective. The design and use of the diamond ATR microscope objective allows for the selective isolation of individual minerals for simultaneous collection of microscopic, optical and infrared data. These types of evaluations enable the indisputable identification of minerals. Infrared microprobe analysis requires virtually no sample preparation, and enables direct infrared spectroscopic analysis of unknown mineral samples. When coupled with a preliminary examination using traditional methods of polarized light microscopy, complete analysis of an unknown mineral can be performed easily and in a short time.

When infrared spectroscopy is combined with light microscopy the analysis of minerals is enhanced. The three "R's" of modern forensic analytical methods are: rapid, reliable and reviewable. Speed is essential for short turn-around times and reducing case backlogs. The analytical method controls the rate of analysis, and with the diamond ATR microscope objective, mineral identification can be done in minutes. Reliability is crucial. There is zero tolerance for false positive results. Infrared microprobe analysis is not only consistent, but is even sensitive enough to distinguish between mineral polymorphs (minerals with identical chemical formulas that exist in two or more structures). For example, calcite and aragonite, two mineral polymorphs of calcium carbonate, are readily distinguished using diamond ATR analysis. Results and procedures must be reviewable, providing a check on the expert's testimony and protecting the defendant's rights. Modern infrared microprobe analysis satisfies this requirement by creating a reviewable report that combines the microscopic, optical and infrared data. The ability to integrate polarized light microscopy with infrared microprobe analysis to minerals is unprecedented.

Identification of Analogs of 3,4-Methylenedioxyamphetamine (MDA) by Mass Spectrometry with Quadrupole Filter

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Mass spectrometry (combined with gas chromatography) has been incredibly useful in recent years to forensic science in the identification and elucidation of chemical structures. For isomers and other molecules of similar structure, a clear interpretation of data is required for differentiation.

The molecule of 3,4-MDA undergoes fragmentation in MS via three pathways: (1) rearrangement; (2) alpha cleavage via the amino group; and (3) alpha cleavage via the benzyl group. Mechanisms will show how are produced known and significant peaks in the spectrum. One will also explain the fragmentation of certain distinct peaks, in lieu of comparison with deuterated samples (and their mass spectra).

Key points of interest, besides ion fragment elucidation, also include differentiation between 3,4-MDA and 2,3-MDA, reliant on the position of the oxygens relative to the aromatic carbons, and subsequent rearrangement. The appearance of a fractional molecular weight (m/z = 81.5) in the spectrum is due to the existence of a multiply-charged ion (e.g., m/2z) - and is not a metastable ion. Also, two distinct ion fragments in the 3,4-MDA spectrum have the same mass (m/z = 91); differentiation between the two, though usually not necessary, can be explained with comparison to deuterated samples as well as mechanistically.

Frozen Methamphetamine as an Alternative to Chemical Extraction in Methamphetamine Synthesis

Vien Zhivago, Forensic Chemist, Drug Enforcement Administration, Southwest Laboratory, 2815 Scott Street, Vista, CA 92081

The clandestine synthesis of methamphetamine is frequently performed using household chemicals and equipment. These household products serve as substitutions for reagent grade supplies which may be difficult to obtain due to restrictions imposed by Federal and State legislatures. Although these restrictions are designed to combat clandestine drug synthesis they also serve as the impetus for new methods and techniques which may be used to complete a synthesis. In the past year, several intelligence reports have surfaced which suggest that methamphetamine "cooks" have utilized household freezers to effect the separation of methamphetamine base from a basic/ aqueous layer. This process would be advantageous since it would not require the traditional organic solvents. This presentation will discuss the viability of these claims.

Notice to CAC Members

Please review the following amended by-law changes. These changes were voted on by the membership at the Business Meeting in May, 2006. You had received these a month before the business meeting as required by the CAC By-laws Article XIV, Section 2.

Amended Bylaw Changes

The sections with changes are listed below and are in ***bold italic***. Also included is the wording to be eliminated, shown with a ~~strikethrough~~.

Title
Article I, Section 3
Article I, Section 17
Article II, Section 1A
Article II, Section 1B
Article II, Section 2B (6 to b)-typo on the website
Article II, Section 2D (only change a capital "T")-typo
Article II, Section 2E.1
Article II, Section 3 (2nd paragraph)
Article III, Section 9 (spacing between "the" and "member")-typo on the website
Article III, Section 13
Article IV, Section 6-typo on the website

THE BYLAWS OF THE CALIFORNIA ASSOCIATION OF CRIMINALISTS
As Amended – ~~October, 1990~~ ***May 2006***

ARTICLE I
SECTION 3: ~~Stimulate research and the development of new projects~~. ***Encourage and, if possible, financially support worthy research projects.***

SECTION 17: ~~Establish, offer and administer a certification testing program.~~ ***Support certification testing programs*** for individuals engaged in the practice of criminalistics.

ARTICLE II
Members:

SECTION 1: Membership in this Corporation shall be limited to persons who:
A. Are presently employed as laboratory scientists professionally engaged in one or more fields directly related to the forensic sciences; have demonstrated ability to conduct work requiring college level education in appropriate physico-chemical ***or biological*** sciences; and have been elected to membership by three-fourths of the members present and eligible to vote at a regular business meeting of the Corporation.
B. Are ~~full-time~~ ***college-level*** students pursuing a course of study toward a career in a forensic science and have been elected to Affiliate membership by the Board of Directors. Affiliate Members who have completed their course of study may retain their membership status while actively seeking employment ***for 3 years after the completion of their degree*** and for six months after beginning employment in the forensic sciences. ***Interns, laboratory technicians, and volunteers employed in a forensic science laboratory may be affiliate members as long as they are employed by a forensic laboratory.***

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SECTION 2: There shall be five classes of membership in the Corporation:

D. Corresponding Member: All persons who were corresponding members of the predecessor unincorporated association, the California Association of Criminalists, and applicants who, because of their place of residence or employment, are unable to regularly attend meetings and seminars, and who meet the basic qualifications for membership in the Corporation, shall be classified as Corresponding Members. Corresponding Members will not be required to attend seminars and they shall not be eligible to hold office. ***T***hey shall be subject to all dues and assessments levied against a Full Member or Provisional Member.

E. Affiliate Member:

1. Any ~~full-time~~ ***college-level*** student, ***intern, laboratory technician, or volunteer employed in a forensic science laboratory*** pursuing a course of study **or** a career in a forensic science. Any ~~student applying~~ ***application*** for Affiliate Membership shall ~~have his application~~ ***be*** submitted by, and with the recommendation of, a ***full, life, or provisional*** member of the Corporation.

SECTION 3: Change in Membership Classification: It shall be the function of the Board of Directors to propose the advancement of Provisional or Corresponding Members to the class of Full Member. Proposals for advancement shall be voted on by the membership as soon as practicable at a regular business meeting.

Proposals for change in the class of membership of a member shall be based upon consideration of the member's efforts and attainments in the field of forensic science, his attendance at seminars and his participation in the activities of the Corporation. ***Provisional or Corresponding Members must complete one of the following requirements to be eligible for consideration for Full Member status:***

During two consecutive years <u>or less</u>, obtain at least six points from the list below: (or)

During three consecutive years <u>or less</u>, obtain at least nine points from the list below:

Points are awarded as follows:
CAC Workshop or Seminar attendance – one point/day
CAC Study Group Meeting attendance – one point/day
Active participation on CAC committee – two points (to be determined by chair)
Active participation as a CAC study group chairperson-two points (to be determined by the Regional Director)
Presentation of a paper at CAC seminar – two points
Publishing a paper in <u>Science and Justice</u> – three points
Publishing a technical paper in the CAC News – one point
Other CAC related activity – points to be determined by CAC Board of Directors

ARTICLE III

SECTION 9: The President, or, in his absence, the President Elect, or, in the absence of the President and President Elect, a Chairman, elected by the members present, shall call ***the meetings*** of the members to order, and shall act as the presiding officer thereof.

SECTION 13: At any meeting at which the number of ***voting*** members present, in person or by proxy, is less than one third of the number of ***voting*** members of the Corporation ***(see Article II, Section 4),*** no matters requiring a general vote of the membership of the Corporation can be voted upon, unless such matters were specifically contained in the Agenda of the meeting sent to the membership pursuant to Article III, Section 3(B) and 3(C).

ARTICLE IV

SECTION 6: All meetings of the Board of Directors shall ***be held as directed*** from time to time by the board.

norah rudin & keith inman • the proceedings of lunch

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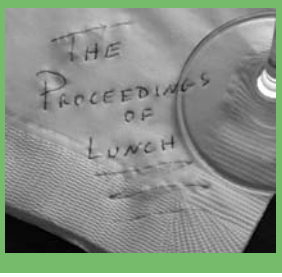

A Frosty Debate: The Chilling Effect of a "Cold Hit"

To listen to the chatter, one might become convinced that a true controversy exists regarding how to present the statistical weight of a cold hit in a DNA database. The debate centers around the issue of whether a cold hit in the DNA database should be assigned a different statistical weight than a DNA profile match that was obtained through conventional detective work. The issue was initially addressed more than a decade ago, when the first National Research Council report on DNA, fondly known as NRC I, was published in 1992. In anticipation of the widespread use of convicted felon databases, the NRC I committee suggested that one set of loci be used to search the database for probable cause and an independent set of loci be used to provide a statistic for the actual prosecution. In the second NRC report, published in 1996, (and just as fondly known as NRC II), the committee proffered a completely different opinion on how to treat database matches in the absence of prior investigative leads. They offered that the profile frequency[1] (P) should be multiplied by the current number of samples in the database (N) to somehow compensate for the fact that the suspect sample was identified through a database search using an evidence profile.

While few forensic DNA laboratories of which we are aware have actually implemented either of these approaches in any meaningful fashion, some scientists and statisticians have tenaciously clung to the "NP" approach suggested in NRC II. This is most appreciated by attorneys attempting to craft a defense for a client who has come to the attention of law enforcement solely through a cold hit.

Certainly, elite statisticians can be quoted to support both sides of the issue. (Balding, Dawid, Devlin, B., Donnelly, Stockmarr) And not surprisingly, attorneys are polarized along party lines. DNA experts have also picked sides, aligned mostly, and somewhat sadly, with the side of the bench for whom they do the most work. The debate amongst the statisticians remains vigorous, though polite. And it would seem that the rest of us muggles can only sit on the sidelines and wait for the wizards of forensic statistics to resolve the issue amongst themselves. In the meantime, battles continue to be waged in court, although perhaps with somewhat more vitriol than in the ivory tower of academia.

This issue was the focus of a spirited debate at conference we recently attended in Dayton, Ohio. (Forensic Bioinformatics) Also in attendance was one of the aforementioned elite statisticians, Dr. David Balding. Dr. Balding has written and spoken extensively on forensic DNA issues, including that of a cold hit in a database. (1995, 1996, 1997, 2002) While we did manage to have "lunch" (which for some of the group was entirely liquid) with Dr. Balding at the airport as we waited for our respective planes to depart, much of this discussion was conducted via e-mail. Consequently, our keyboards are that much stickier and the crevices have accumulated commensurately more crumbs.

The NRC II recommendation

As we begin our discussion, we wonder if we correctly remember what exactly the NRC II committee recommended, more than a decade ago. Within the executive summary on pg. 7, they state that:

"*The relevance of the random match probability is less obvious*" and also that, "*The probability that at least one of the profiles in the database would match the incriminating profile cannot exceed NP.*"

On pg. 32, we find the recommendation that:

"*If the only reason that the person becomes a suspect is that his DNA profile turned up in a database, the calculations must be modified.*" They then qualify their comment to say that, "*However as the databases grow large enough to be a substantial fraction of the population, a more complicated calculation is required. Although*

At this point we begin to wonder: what is a substantial fraction? What is the calculation? Why do we need a different one? What about the case circumstances would affect the calculation of a case-circumstance independent database hit?

[1]Although the phrase "match probability" or "random match probability" is frequently used in place of "profile frequency", it is formally incorrect. The probability of whether two profiles match depends not only on the profile frequency, but other issues such as population sub-structure and relatedness.

such a calculation can be straightforward, it is best handled on a case-by-case basis.

At this point we begin to wonder: what is a substantial fraction? What is the calculation? Why do we need a different one? What about the case circumstances would affect the calculation of a case-circumstance independent database hit? A similarly opaque qualification is reiterated on pg. 40.

"If one wishes to describe the impact of the DNA evidence under the hypothesis that the source of the evidence sample is someone in the database, then the likelihood ratio[2] should be divided by N. As databases become more extensive, another problem may arise. If the database searched includes a large proportion of the population, the analysis must take that into account. In the extreme case, a search of the whole population should, of course, provide a definitive answer."

This restatement does not seem to provide any further clarification. Rather, we begin to understand the "NP" recommendation as an apparent logical fallacy. We discuss this idea with Dr. Balding later in this piece.

But first, it is important to understand the stated statistical basis for the committee's recommendation, finally provided on pg. 134.

"*The initial identification of a suspect through a search of a DNA database is analogous to performing the coin-toss experiment many times: A match by chance alone is more likely the larger the number of profiles examined*." On pg. 35, they further expand to say that "*Under the hypothesis that the person leaving the evidence sample is not represented in the database of N persons, a simple upper bound on the probability of M [a match] is given by NP [assuming p(M) is the same for all profiles in the database]*"

We start with Dr. Balding's response to the coin toss analogy in the next section.

Tossing 20 coins

In his 1997 response to NRC II, Dr. Balding writes:

In database searches, each possible suspect is searched just once and not, like the coins, many times: there is no repetition involved. Moreover, we know in forensic settings that there exists a culprit, which is not the case for the coin tossing model. A valid analogy would be with many sets of 20 coins, among which one set is known to be biased. If some of the sets are tossed and precisely one of them produces "all heads," then the evidence that the biased set has been found increases with the number of sets tossed.

This dichotomy is also expressed in statistics as sampling either with (tossing 20 coins) or without (searching a database) replacement.

In his later 2002 response, Dr. Balding provides even more detail as to why he feels coin tossing is an inappropriate analogy:

"*The NRC committee motivated their recommendation by an analogy with repeated coin tossing: 20 heads from a single toss of 20 coins is very surprising, but it is much less surprising to observe this outcome once in many throws of the 20 coins. The inappropriateness of this analogy is manifest. In particular, there is no feature corresponding to the fact that we know in advance that exactly one of the possible culprits is the source of the crime scene DNA. Moreover there is no element of repetition in the database search problem - different individuals have their profiles compared with the crime scene profile, which cannot reasonably be compared with repeated tossing of a single set of coins.*"

In the 2002 paper, Dr. Balding provides an explanation of why he believes many statisticians may be confused:

"*Statisticians have well-honed instincts when it comes to hypothesis trawls - we are taught to be cautious of them because of problems of multiple testing. Consequently, many statisticians instinctively feel that the database search weakens the evidence, i.e., the case against the defendant is weaker in* [a database match] *than in* [a standard match]. *Such instincts may serve us well in other settings, but they are misplaced in the present context. A crucial distinction is that we know in advance that exactly one hypothesis of the form "X is the culprit" is true.*"

In other words, as Dr. Balding previously stated in his 1997 response to NRC II:

This search scenario is different from the one previously outlined, primarily because it is known in advance that the target of the search exists.

This brings us to back to the apparent logical conundrum enountered by the NRC II committee and others (e.g. Stockmarr), in the process of attempting to defend the "NP" calculation.

The end game

The NRC II report alludes to the fact that NP breaks down as databases get bigger. Dr. Balding suggests that this should be a clue that the logic behind the calculation is incorrect.

If individuals are successively searched and excluded from consideration as possible suspects, the effect of these exclusions is to increase the probability that an individual subsequently found to match is the culprit.

The correct intuition becomes clear if one considers the extreme situation in which the database includes the DNA profile of everyone who might have committed the crime. If only one match is observed, and laboratory or other error is exceedingly unlikely, then the case is overwhelming. The logic of recommendation 5.1 is that the evidence is very weak because the number of individuals searched is so large. The same intuition applies, with less dramatic effect, in the case of databases that contain the DNA profiles of only a small proportion of the population of possible culprits.

NRC II acknowledges this counter-example but does not concede its effect of undermining recommendation 5.1. Instead, it suggests that, although initially evidence is weakened as the length of the search increases, at some point this effect is reversed and very extensive searches result in extremely strong evidence. Readers are given no advice on how to determine the point at which the switch from ever weaker evidence to extremely strong evidence occurs. The absurdity of the report's position here clearly weakens its credibility on other issues.

[2] For a complete single-source profile, the likelihood ratio (LR) is mathematically the inverse of the profile frequency. For example, if the profile frequency is 1/100, the LR is 100.

We asked Dr. Balding if he has a similar vigorous objection to NRC I's idea of using one set of loci for "investigation" and an independent set for "confirmation" or "prosecution". Through e-mail he replied that:

I don't have a huge objection to this in that, unlike NRC II it is rational and not plain wrong-headed. But I don't like it: we don't adopt elsewhere the principle that the evidence that led us to the suspect can't be used as evidence against him in court, and nor should we I think.

With this comment, Dr. Balding introduces the concept that evidence is evidence, regardless of whether the data was gathered by a person or by an instrument.[3] He does not make a distinction between a search of Caucasian males between ages 18 and 45 for a visual match and a search of a DNA database for a profile match.

Dissecting the logical fallacy

As the architects of "NP" explicitly acknowledge, the calculation breaks down at some undefined point as the database grows. In is 2002 paper, Dr. Balding explicitly addresses this issue:

Stockmarr[4] acknowledges that this LR suggests that evidence weakens as the database size increases, which conflicts with the fact that, when the database is large enough to include most or all possible offenders, the evidence must be overwhelmingly strong.

Dr. Balding goes on to define the two relevant hypotheses that should be compared:

Scenario 1. Evidence is presented that a particular one of the hypotheses is true.

Scenario 2. Evidence is presented that a particular one of the hypotheses is true and that many of the other hypotheses are false.

He continues to say that,

Expressed in these terms, it becomes clear that the additional evidence strengthens the case against the defendant. Informally, if you know that there exists at least one member of a population satisfying your search criterion and you are concerned with whether or not it is unique, then the bigger the search resulting in a single match, the more you have reason to be convinced that the observed match is unique in the population. In practice, the magnitude of the effect of the additional evidence is usually modest because relatively few of the alternative possible culprits are included in the database. However, if the database includes most of the possible culprits, then a unique matching profile in the database provides overwhelming evidence against the defendant because (under our simplifying assumptions) the search result eliminates most of the alternative hypotheses. Moreover, intermediate situations imply intermediate conclusions, i.e., every alternative possible culprit eliminated from suspicion because his DNA profile is found not to match implies a (slightly) stronger case against the unique individual found to match.

At this point, you may be wondering why we didn't just tell you to go read Dr. Balding's papers and leave it at that. Well, you should do that anyway – our excerpts here don't do them complete justice. But we now segue into the meat of this article. Readers of our continued writings will not be surprised to learn that the real issue is:

What is the question?

Ultimately, the disagreement is not with any mathematics, but rather about the relevant question. No one disagrees that the "NP" calculation answers the question of how likely it is to find a particular profile when searching against every profile in a defined database; nor does anyone disagree that the profile frequency itself estimates the probability to find a single profile in a defined population. Obviously, the more profiles one compares, the more chance to find a matching profile; also, just as obviously, the more profiles one compares and eliminates as matching, the fewer profiles in the world remain that could possibly match.

The issue is to what question should the trier of fact be provided with an answer:

1. What is the probability of finding a match when searching a particular profile against EVERY profile in a defined database (the database match probability, or DMP)?

or

2. What is the probability of finding a match against ONE particular individual sampled from a population (the random match probability, or RMP)?

This dichotomy is at the heart of the disagreement. Recently, a draft paper by Dr. Keith Devlin that attempts to address exactly this issue came to our attention. (2005) He has since also published more simplistic versions of his thoughts in a column not dissimilar to this one. (2006a, 2006b) Readers who are seriously interested in this issue should read Devlin's writings, as well as review the previous articles, both pro and con, from the other statisticians referenced at the end of this article. For our purposes here, since most of you have either already gone to sleep, back to work, or at least for another cup of coffee (or worse yet, an adult beverage), we will summarize a few of Devlin's comments and excerpt Dr. Balding's responses to them from our e-mail exchanges.

The Monty Hall problem

The Monty Hall problem, a classic statistical brain-teaser, is proposed by Devlin to help explain the differences between the Bayesian statisticians and the "frequentist" statisticians – the two groups who disagree on how to handle database cold hits.[5] It has to do with how the odds of the prize being behind door number three vary depending on whether Monty (who knows where the prize is) or a random person (who doesn't know where the prize is) opens door number two. For a full treatment, we refer the reader to Devlin's excellent discussion and many other sources. For this discussion, we simply point out that the salient issue in the Monty Hall problem is that knowledge about the world influences the statistical probabilities in a very real and concrete way.

[3] The difference between an instrument and a machine is that an instrument costs more than $10,000.

[4] An oft-quoted paper (1999) by Anders Stockmarr, a statistician who support the NRC II recommendation of "NP"

[5] Interestingly, working crime laboratories in the U.S. follow neither camp. Typically, the fact that a suspect was discovered through a cold hit is simply ignored and a standard, non-Bayesian, profile frequency is provided.

Bayesian treatment of cold hit statistics

While many statisticians agree that Bayesian statistics are the gold standard for calculating the strength of DNA matches, especially in complex instances involving mixtures and partial profiles, they seem to run up against a philosophical problem when applying them to strength of a cold hit in a database. To remind the reader of a couple of basics, a full Bayesian treatment involves stating some prior probability of the event in question and updating that probability by multiplying by a likelihood ratio (LR) to calculate a posterior probability.

Prior probability x LR = Posterior probability

The prior probability is often (but does not have to be) based on non-scientific evidence resulting from detective work. The DNA (or other scientific) evidence is expressed as a likelihood ratio which simply compares the probability of seeing some specific evidence (in this case DNA profile) under different hypotheses, for example:

1) The probability of seeing the evidence if the subject (e.g. suspect or victim) is the source of the evidence 2) The probability of seeing the evidence if the match is coincidental and another person is the source of the evidence

To simplify our discussion, consider the easiest situation, a single source profile, for which the LR is simply the inverse of the profile frequency.[6] For example, if the profile frequency is 1/million, the LR is 1 million. While the choice of hypotheses and how to calculate them can be argued for complex data, for a single source profile, the LR is not the issue. The issue for cold hit data is the prior probability. What is it and who should choose it? Devlin correctly states that, to apply a full Bayesian treatment to either a standard case or cold hit, one must assign a "prior." In a standard case, some reason exists to believe that the suspect is guilty, or at least contributed the evidence. The reason is that a detective says so based on some non-DNA evidence. Nevertheless, Devlin argues that, because the unfortunate individual who was the target of the database hit was not under prior suspicion, the Bayesian "prior" must be 0. In his own words:

"Now, you can apply Bayes' theorem as often as you like, but if you start with a prior probability of 0, then you will get 0 at every stage. You will continue to get a probative value of 0 after incorporating (via Bayes' theorem) any evidence obtained from the DNA profile match the FBI obtained on the 5 CODIS loci[7] not used in the original cold hit search and after incorporating any evidence obtained from any other sources. That would of course make life extremely easy for the Defense Counsel in the case, but it is unlikely that the prosecution would want to go down that path."

Dr. Balding related that he was extremely disappointed with Devlin's analysis:

He thinks he dismisses the Bayesian approach entirely by assuming a zero prior; but a zero prior is absurd as we (usually) know that someone did it. What prior to choose isn't our problem, we are here to help jurors who need to make these choices, but for the sake of argument a prior of 1/population for everyone who could have committed the crime is reasonable. Devlin says it would be impracticable to exclude every other individual, yet logically that is what the prosecution has to do in every case since "defendant did it" and "every other person on earth did not do it" are logical equivalents (given some assumptions that I think are OK: there was a crime; one person did it, etc). Devlin ought to be able to appreciate, or at least consider, that "innocent" doesn't mean probability zero—which would be absurd—but means "just as unlikely to be the culprit as anyone else."

He goes on to mention that:

There is a logical contradiction on pp 38-39: he is perfectly happy with a 1/100,000,000 probability of guilt following from the 8 locus match, and with using this as a prior for the subsequent 5 locus match. But what is his prior before any test that leads to the 1/100,000,000 figure posterior to the 8-locus match? His argument that the prior ought to be zero means it is still zero after the 8-locus test.

Towards the end of the article, Devlin relates an apocryphal story of the ancient philosophers arguing about how many teeth a donkey has. Like the young boy in the story, he urges us to simply count the donkey's teeth. Dr. Balding finds this analogy wanting:

Then he goes on to say we need to count the donkey's teeth, but he simply stops, without showing us where the donkey is. What is he advocating? Acceptance of NRC 1 or II? If the former then fine, none of us has any logical objections to that (except that the principle that evidence that led you to the defendant cannot be used to convict the defendant isn't used in other evidence areas, I think, and I feel it unwise to adopt this unnecessary principle). If he is advocating NRC II, then how does he explain the connection between the probability of match in a database search (DMP) and the weight of evidence against the suspect? How does he deal with the problem that if we have a very large database then the DMP gets large, suggesting weaker evidence, whereas logically the evidence, assuming a single match, gets stronger?

He continues:

I think Devlin starts to go off the rails with his discussion of Bayesian versus frequentist probability. He is very clear that Bayesian probability statements concern your information about the world, which is perfectly appropriate in court where a juror has to assess the information presented to him/her. He is also right that frequentists are uncomfortable with this subjectivity and seek to make objective probability statements about the real world that are independent of any observer, but he must appreciate as a philosopher that whether or not this objective can be achieved is highly questionable: all our knowledge about the world comes through our senses. But even if we grant him this, and also grant him that the DMP is an objective probability, he has to argue what on earth this probability has to do with the question the jurors are concerned with, whether the defendant is guilty. In fact, the DMP is more-or-less irrelevant to that question.

[6] The probability of seeing the DNA profile if the subject in fact is the source is 1; the probability of seeing the DNA profile if the match is coincidental is the profile frequency.

[7] The case that he uses as an example apparently involved a cold hit using 8 loci and confirmation using 13, of which the original 8 were a subset.

He amplifies in a later email:

The number of pairwise matches in a database doesn't answer the question relevant in a trial [because] it compares every pair of individuals, not one individual with every other. If we had a worldwide database there'd be 7 billion entries and so 24.5 x 10^{12}pairs. There'd be sure to be lots of pairwise 13/13 matches, but the expected number of matches for any one defendant would still be much less than one.

So we are more or less back to where we started, ***What is the Relevant Question***? We contend that, in a trial, the jurors and jurists want to know the likelihood that this client is falsely implicated by the DNA. As Balding makes abundantly clear, a search of the database, resulting in a single match, strengthens the case against the defendant. The larger the database searched, the more alternative hypotheses are eliminated, and the stronger the case becomes against the defendant. Assuming 1) a complete single source profile, 2) appropriate correction for substructure and relatedness and 3) no false positive error, the RMP is a conservative estimate of the strength of the DNA match. All of those assumptions are important and bear further discussion.

But for now, we leave the reader to go back to her lunch (or perhaps, in desperation, to find that adult beverage).

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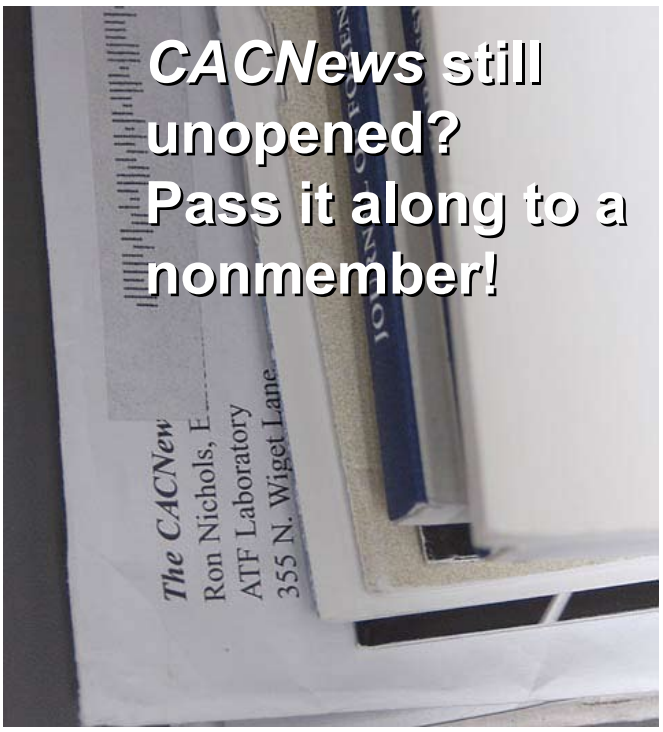

2007—The Year of the "Swap"

Rather than planning for a trip to Northern California, those in the southern portion of the state can expect to stay closer to home for the upcoming Spring CAC meeting in May as the seminars have swapped locations for the immediate future. Rather than going north in May and south in October, attendees will be going south in May and north in October.

Why the swap? Simply, there have been events that have been isolated at one of the two seminars including award presentations and, most importantly, elections. Elections for the various positions on the Board of Directors are held in May and, increasingly, we were witnessing more and more northern representation at the May meetings due to budget and travel constraints. In addition, some awards have been routinely presented either in the south or in the north – it's time to switch things around, at least for a bit.

We trust that this change won't prove to be an obstacle to continued success of the semi-annual seminars. However, with this change, we will have to collect swarms of data to actually validate the swap so make your voice known! Send all complaints to our CAC Quality Assurance Officer at trashbin@cacnews.org.

—Ed.

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The CAC is requesting copies of the CAC Minutes from the past. If anyone has the minutes before 1998, please contact our recording secretary Mary Hong at rd81313@fss.co.orange.ca.us

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Going through menopause is bad enough without being a murder suspect! I thank you, once again, for having a great product.

Well, gotta go, have to write to the Hefty bag people.

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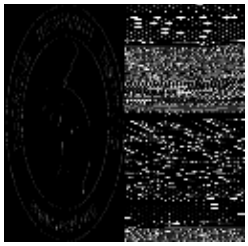

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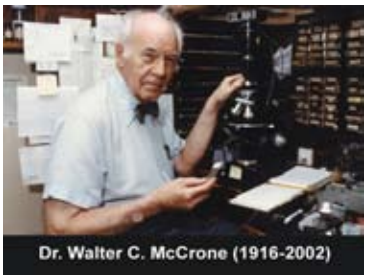
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FORENSIC AND TRACE EVIDENCE COURSES

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same as Applied Polarized Light (PLM) Microscopy (1201)
Jan. 8-12 March 12-16
April 23-27 June 11-15
August 13-17 Oct. 15-19
December 3-7

Adv. Forensic Microscopy (1701*)
same as Adv. Applied Polarized Light Microscopy (1251) June 18-22

Forensic Hair and Fiber Microscopy (1207) June 4-8

Microscopy of Soils (1710)
March 19-23

Forensic Microscopy of Glass (1712) INQUIRE

Forensic Paint Microscopy (1715*)
August 6-10

Microscopy of Illicit Drugs and Excipients (1726*) Oct 29-Nov 2

Microscopy of Explosives (1722*)
Feb. 26- March 2

SPECIALTY COURSES

Pharmaceutical Microscopy (1203)
November 26-30

Polymer Microscopy (1205)
INQUIRE

Microscopy for Art Conservators (1206) April 16-20

Microscope Cleaning, Maintenance, and Adjustment (1301)
March 26-27 November 1-2

METHODS COURSES

Digital Imaging & Photomicrography (1105) INQUIRE

Applied Polarized Light (PLM) Microscopy (1201)
same as Forensic Microscopy (1204)
Jan. 8-12 March 12-16
April 23-27 June 11-15
August 13-17 Oct. 15-19
Dec. 3-7

Adv. Applied Polarized Light Microscopy (1251*) ***same as Adv. Forensic Microscopy (1701)***
June 18-22

Chemical Microscopy (1202)
(at Cornell University in Ithaca, NY)
July 30-August 3

Fluorescence Microscopy (1210)
INQUIRE

Microchemical Methods (1270A*)
October 1-5

Scanning Electron Microscopy and X-Ray Microanalysis (1402)
April 9-13 November 5-9

Practical Infrared Microspectroscopy - FTIR (1422)
Jan. 29–Feb. 2 April 16-20
Dec. 10-14

Raman Microscopy (1430)
August 13-15

Sample Preparation & Manipulation for Microanalysis (1501E)
June 25-29

Prerequisites: Course 1201/1202/1204 (Applied Polarized Light Microscopy/Chemical Microscopy/ Forensic Microscopy) or consent of instructor; 1608A for 1608B; 1630 for 1631.

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