The CACNews

News of the California Association of Criminalists • Third Quarter 2014

Greetings & Felicitations

greg
LASKOWSKI

CAC President

I heard a number of members complain that because of laboratory accreditation matters, they had little time to devote to outside activities, even those remotely associated with their work...

This is my first letter to you as president of this great association. First, let me say that when I entered the field of criminalistics some 35 years ago, my first job was with the Kern County Sheriff's Department in Bakersfield, California. I was fresh out of college, and was eager to learn the ropes. My supervisor made the suggestion that I should join a professional organization in my field. He suggested the CAC was a good organization to join. Funny thing, though, that supervisor was not a member of the CAC and never did join. As part of my job, training in the various areas of criminalistics was encouraged, and attendance at CAC meetings was one way to obtain training and expertise. One of the first training conferences that I attended was a CAC meeting. I believe it was up in Oakland. After attending that meeting, I knew that I wanted to become a member of the CAC. So, I went out and gathered my required references and submitted my application to the CAC. In fact, there were a couple of other criminalists in our agency that submitted applications to join the CAC as well. I was not able to attend the meeting where I was accepted as a member, which occurred on my twenty-seventh birthday on May 14, 1982, but I remember the day when a co-worker returned from the meeting with my CAC pin and the certificate, which was embossed with my name in calligraphy signed by then President Ed Rhodes. I had arrived!

The years went by, I worked in one lab throughout my career although the Kern County District Attorney's Office took oversight of the laboratory from the Kern County Sheriff's Department as the result of a political decision. And as I progressed through the ranks, I joined a number of other fine forensic science organizations, the AAFS, AFTE, IAI, and CACLD. Most of those organization held their meetings out of state for the most part, but the CAC was always within driving distance, and it was held two times a year. I attended some meetings, presented papers at a few, and even served stints on the Merchandise Committee (I was a poor salesman. I can't remember selling a single t-shirt, coffee mug, or tie) and the Ethics Committee (I was grateful that no ethics matters arose during my tenure on that committee, sometimes being the Maytag Repairman is a good thing). After 35 years of pursuing a career that I loved, I needed to leave the laboratory that spawned my career and avocation. What to do now? I still had some adjunct professorships to keep me busy. CSI:, the television series was/is still popular, and the producers and writers needed my advice, I was sitting on some subcommittees and committees for some of the aforementioned forensic organizations, so what to do with the rest of my time? I immediately thought of the CAC. We were and still are feeling economic hard times. I heard a number of members complain that because of laboratory accreditation matters, they had little time to devote to outside activities, even those remotely associated with their work, and some stated that their agencies or lab managers weren't giving them full support for outside lab training. So, I decided that I could

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Notice to Contributors: We publish material of interest to our readers and are pleased to receive manuscripts from potential authors. Meetings and course announcements, employment opportunities, etc. are also solicited. Advertisements are also accepted, although a fee is charged for their inclusion in *The CACNews*. Please contact the advertising editor for further information.

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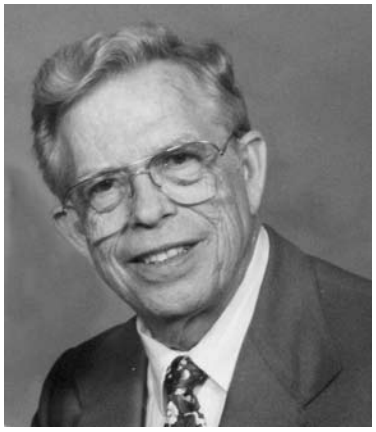
The deadlines for submissions are: December 1, March 1, June 1 and August 15.

Purple Haze
Students in the UV-Vis workshop shed some light on the evidence at the spring seminar in San Diego. *More photos inside.*

INSIDE

Francis H. Cassidy
1924-2014



Frank Cassidy, 90, of Santa Barbara passed away peacefully on April 6, 2014, surrounded by his loved ones.

In the early 1950s, Frank graduated from Gonzaga University, Spokane, WA, with a Bachelor of Science degree in Chemical Engineering. He moved to Southern California to work in the aerospace industry at Aerojet General.

Frank enjoyed sunny California. With a smile, he would say, "The worst California weather still beats a winter in Montana!"

For his entire life, he believed in the unconditional love of God for all, and celebrated his belief with those who also attended his Catholic Church parish. As a newcomer to California, Frank joined the Catholic Youth Org., and met his future wife, Ann, while bowling. (His children always teased him that he met Ann in an alley.) They fell deeply in love and married in July 1954, and raised 4 children. Their love held fast through life's trials, including job-related transfers; moving households; and a new job. This last job landed the whole family in Santa Barbara, where Frank and his dearly loved Ann have lived since 1973.

Frank changed careers in the early 1970s to work for the D.O.J. of California as a criminalist, analyzing evidence for various law enforcement agencies. He was a member of the professional organization, AFTE. (From an obituary published in The *Santa Barbara News-Press* Online Edition April 9, 2014.)

Frank may have officially retired in the spring of 1995., but that wouldn't last. A few months later he hired back as a "retired annuitant" and continued to work in criminalistics for many more years.

Long-time friend Lou Maucieri remembers Frank:

"After W W II US Air Force service, Frank earned a B.Sc. in chemical engineering from Gonzaga University ca1949. We both worked at Aerojet General in Southern California during the Viet Nam war era. I was in the analytical chemistry lab and he would bring me exotic samples from his many classified projects: failed 'O' rings, spacecraft parts, heat transfer fluids…they all needed analysis. Soon our families socialized—home visits, dinners, car trips, and camping. He proved to be an expert at baking. His cinnamon bread was a gourmet fantasy for us and our kids.

"Frank was transferred to Sacramento around 1972. Always wanting to improve, he took classes in typing and accounting, started a small farm in his back yard—complete with ducks and a pond, and rebuilt the engine of a used car! Learning of the fledgling DOJ laboratory system, he decided to change careers. He passed the criminalist entry exam and was posted to the (then) San Luis Obispo lab, and next, the full service lab in Santa Barbara.

"His accomplishments at DOJ were many and varied. Frank became an expert in blood alcohol cases and testimony. He taught the first DOJ forensic microscopy class in 1974-'75. He mastered firearms and toolmark cases and was a member of CAC and AFTE. Some of his seminar presentations: "Use of a Theodolite for Crime Scene Mapping","Design of Cooling Platens for Isoenzyme Analysis", "Pyrolysis GC Analysis of Chewing Gum", "Methods of Bullet Short Trajectory Analysis", "Sequentially Manufactured Channellock Pliers." Over his twenty-year career at DOJ, he published over ninety articles in *JFS*, *JFSS*, and *Tie Line*—the DOJ lab journal. He became so prolific that one *Tie Line* issue was an 'all- Frank Cassidy' offering! In retirement, he continued in teaching—religious classes for adults.

"A progressive hearing loss was blamed on test-firing guns, but I believe it was from serving as the flight engineer on a WW II B-25 bomber- the loudest aircraft in the USAF inventory!

"Hearing of his passing, I reflected on the many contributions, abilities, and interests of my long time friend. But then, I guess it's true, for the truly educated there can never be a graduation!"

In the first issue of the new millennium, [*CACNews* 1st Q 2000] Frank responded to a request to share his vision of the future of the profession.

He wrote, "The field of criminalistics, like other scientific disciplines, has advanced very rapidly and will continue to do so in the next millenium. Where is it going? How is it going to get there? In light of this, there are a number of thoughts that I have in respect to *Criminalistics in the New Millenium:*

"1. It is going to be incumbent on the criminalists to aggressively seek new education continuously to remain abreast of their fields;

"2. Because of the continuing advancement in certain areas of criminalistics, it will be necessary to become more specialist-orientated. This presents a new problem;

"3. This new problem—especially in those laboratories that have generalist criminalists—is that there will be a great necessity to increase the number of criminalists in the laboratory. This will become a problem from the financial aspect. But if it is necessary to have satisfactory analysis of physical evidence—as the courts are dictating—it will be necessary to obtain additional funding;

"4. The continual upgrading of evidence evaluation techniques will necessitate a greater obligation to upgrade the methods of evaluation. Much of this will be by computers. As we have seen, the computer manufacturers may not support their software for very long periods of time because of such a rapid change in newer software. This will add more fiscal problems;

"5. With the continual changes in technique, there is going to be a demand for greater control—not only by the laboratory but also by the professional organizations and by ASCLD. Hopefully, ASCLD will not bring to bear such a heavy hand that it stifles the individuality of the criminalist;

"6. With the greater emphasis on science, one must not lose the moral basis behind justice. I think that everyone should review the short article, "Not Just a Box of Swabs," by Jill Spriggs [*CACNews*, 3rd Quarter 1999]. A criminalist must not forget that it is human beings—suspect(s) and victim(s)—that our work is involved with. Thus, the need to have morality and empathy is an absolute necessity.

"These are the thoughts of a retired criminalist—physically, but hopefully not mentally. Criminalistics has been a very satisfying field of endeavor for me and I think that I have done some positive things that have minutely advanced the field.

"And I am eager to see what the future holds for this great profession."

A tiny sampling of the dozens of articles published by Frank include: "Some Commments on Refractive Index Measurernents," *CACNews,* Dec. 1981.

"Laboratory Aid: A Method to Aid ln the Precision of Trigger-Pull Determination," *CACNews,* Sept. 1981,

"Replication of Identifying Marks When Using Mikrosil Castings," *AFTE Journal*, Vol. 25, No . 2, (April 1993).

"New Colors of Mikrosil Casting Rubber Help in Toolmark Identification," *CACNews,* Fall 1995

"Examination of Tool Marks from Sequentially Manufactured Tongue and Groove Pliers." *J. For. Sci.*, Vol. 25, No. 4, Oct. 1980, 796-809.

"Short-Range Bullet Trajectory Computer Program for MS-DOS Computers", *AFTE Journal*, 1991, Vol. 23. *(Co-authored with John Houde)*

CACBITS

Joe Collier Passes

On March 20, 2014, retired Director William "Joe" Collier passed away. William "Joe" Collier was hired with the Phoenix Police Department in 1962 and retired July 29, 1994. The Phoenix Police Crime lab was originated in 1960 and Joe was hired as the second chemist with the department. At that time the laboratory facility was housed in a converted kitchen of the Elks Lodge. Joe was not only instrumental in establishing what is known as the Phoenix Police Crime Lab but also in the establishment of the Physical Evidence Manual that was used in teaching at the Phoenix Police Academy. William "Joe" Collier became the first bureau director of the crime lab in 1969 and held that title until his retirement in 1994.

William "Joe" Collier is survived by his son Michael Collier, three grandchildren and five great grandchildren.

(From an obituary distributed by the Phoenix Police Dept.)

Fall 2014 Seminar Planning Underway

One door closes and another one opens. It's the same with our seminars! The boards of directors of both the CAC and the Northwest Association of Forensic Sciences (NWAFS) are already working to plan another great seminar. This one will take place in Rohnert Park at the beautiful DoubleTree Hotel in Sonoma Wine Country. Watch your email inbox for more info and registration materials in mid-summer. Until then, please consider submitting your abstract if you are interested in presenting your work at the seminar October 20-24, 2014. You can submit your abstract using our secure form!

Novel Approach to Restoring Serial Nos.

"Performance Evaluation and Utility Assessment of Magneto-Optical Sensor Technology for Detecting and Visualizing Obliterated Serial Numbers in Firearms"

This NIJ Publication is available at https://rti.connectsolutions.com/p937t0wcny2/

Hat-tip: Bob Blackledge

Course Correction

In the 2nd Quarter, 2014 issue of *CAC News*, the McCrone Research Institute's courses list has the wrong description for the **Forensic Paint Microscopy** course. The correct description should read: "This course examines automotive and architectural paints from a forensic point of view. Paint fragments are sectioned and studied by transmitted polarized light and epifluorescence microscopy. Inorganic pigments and extenders are identified by morphology, optical crystallographic properties and qualitative microchemical tests. Although new to the public, this course has been taught for years to trace analysts per a cooperative agreement with the National Institute of Justice."

DNA Sanitizer Wipes Everything You Touch

Not just for hit men, these evidence-destroying sprays will protect you in a world where everyone wants to know your genetic code. Full article at www.fastcoexist.com/3030150/dna-sanitizer-will-wipe-your-identity-off-everything-you-touch

Hat tip: Greg Matheson

Clyde Snow, Human Rights Forensic Scientist Passes

Dr. Clyde Snow, a pioneering forensic scientist who brought scientific rigor to human rights investigations around the world, died last week from complications of lung cancer.

Dr. Snow and Human Rights Center's Eric Stover first went to Argentina in 1984 at the request of Las Abuelas de Plaza de Mayo and the new civilian government to use traditional forensic techniques to identify victims of massacres and other human rights abuses. Dr. Snow's work in this field ultimately transformed the documentation of human rights violations, benefiting families searching for loved ones as well as those seeking the truth.

From an HRC email distribution.

Hat tip: Raymond Davis

Michelle Halsing captured this memory at the spring seminar "banquet" while the S.D. Pardres played just for us.

Robert R. Ogle, Jr.
1939-2014

Bob Ogle at the 2006 CAC Spring Seminar in Concord.

CAC Past President Bob Ogle passed away this past March from complications of a stroke. He was a prolific author in the field of crime scene investigation and also commented on the O. J. Simpson verdict. Several of his books are illustrated below:

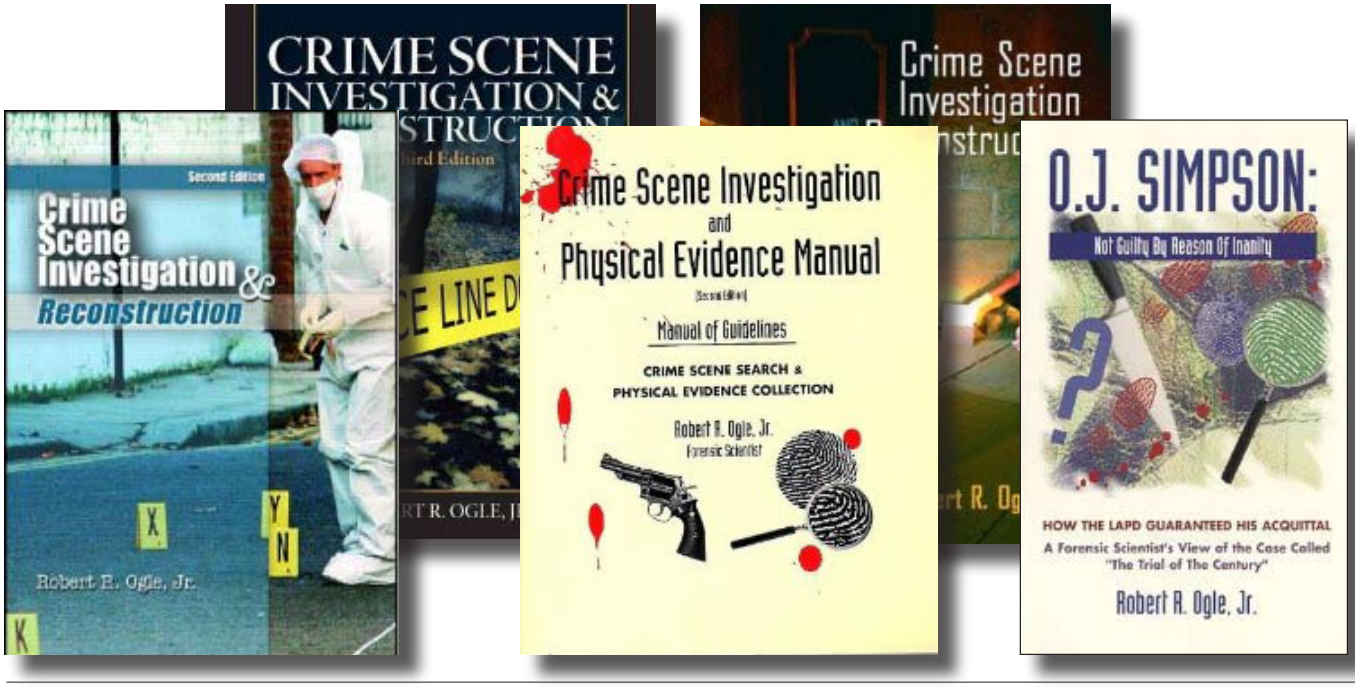
Bob served on the CAC board as membership secretary from 1974-75 and was elected president in 1980. A good insight into Bob's presidency can be gained by reading his second President's Message:

"Responsibilities of Membership in the CAC"

"Membership in the CAC requires adherence to the code of ethics from each member. The need for ethical practice stems from the impact of our work on the lives of others which may lead to the taking of life or liberty from these individuals. This places a burden on us to follow the ideals and the restrictions of our own Code of Ethics.

"The first responsibility we have toward ethical practice is to insure the qualification of our members to practice. In the absence of any formal standards of training, performance or testing the Code of Ethics assumes an important role in the maintenance of acceptable standards of practice by the requirement that our members will not mislead the trier of fact regarding our qualifications. This is an important feature of the Code of Ethics which serves to allow the trier of fact to properly assess the weight to be given to our evidence. The tendency of lay people to give greater weight to "scientific" evidence than it deserves will be minimized where the witness gives an honest account of his training and experience.

"A second responsibility is to insure that we are properly qualified to perform the examinations *we* are asked to do. This is a difficult task owing to the wide variation of experience and training amongst the criminalists performing the same work. What is the minimum quantity and quality of training necessary? What is the standard by which we can judge whether we have received adequate training and experience? These are difficult questions, but they are essential to the concept of ethical practice. Poorly qualified individuals can make errors of omission or commission which have the same net effect as an individual who "slants" their testimony. Should we refuse to do a case our supervisor has asked us to do? Can we? Are we sacrificing quality for security?



"The third responsibility we have as members is to report serious or repeated infractions by other members. Oftentimes, it is difficult to distinguish an honest difference of opinion from an unethical act of one of the parties. Other times, an obvious act of unethical conduct has occurred, and it becomes our responsibility to report the infraction to the president for investigation. The investigation thereby becomes the responsibility of the ethics committee for presentation to the hearing board, where the investigation indicates an infraction has occurred. Without the initiative of the membership, the Code of Ethics would become a hollow instrument for insuring the ethical practice of the members."

In the early 1990's he co-authored a series of papers on human hair: "Human Hair Individualization II: Hair Types and Archetypes," CAC, 81st Semi-Annual Seminar, May 1993, Berkeley, and "Human Hair Individualization: Atlas of Hair Microscopic Characteristics," *CACNews,* Fall 1995. *(Co-authored with Michelle Fox.)*

Most recently, in a letter to the editor [*CACNews,* 2nd Q 2011] Bob commented on a previous column by Keith Inman and Nora Rudin: "...in their *Proceedings of Lunch,* [they] talked about the dispute between the advocates of 'experience' as an adequate base for expertise vs. the advocates of education, training, and mentored experience as a the proper base for expertise in a professional field.

"Fortunately for the CAC members (and all other readers of the *News*) the frequent contributions of these two provide a valuable service to the field formerly known as criminalistics. However, one thing they left out of their report and discussion is the extremely important distinction between one learning in their personal life from experience, and learning a profession through experience. This difference is crucial because the person who suffers from a mistake made by a person learning what to do in their personal life is that person himself, and not anyone else!! When one makes a mistake in professional conduct while learning through "experience," the person suffering from that individual's mistake is another party, not the person making the mistake. This factor is a common element of innocent parties being convicted of a crime they did not commit. To add insult to this process, the person making the mistake rarely, if ever, suffers a meaningful consequence of their incompetence."

Raymond Davis recalls, "I worked with Bob for three years at the Santa Rosa DOJ lab. Here are some of Bob's best qualities: In 1976 he instituted a policy that every report that left the lab had to be read by the technical staff.

"He was fastidious about quality work and productivity, in that order. I recall him complaining once being penalized for not using his entire budget. We continually managed within our budget and as a result they kept lowering the figure.

"Bob always praised us to our agencies. Many times, detectives and prosecutors would tell me how much Bob thought of his criminalists and what great work we performed. He told everyone that we were the best, *period*.

"Bob was not a micro-manager and trusted us to do our job. He was always available to help us and his technical knowledge was quite good. I never heard a negative word about Bob from anyone in the lab.

"Bob loved to party and was generous with his money. Once at a night club he gave his credit card to the waitress and said, "Use it until the numbers fade."

"Bob encouraged me to join the CAC and it was his push that finally made me take the plunge. The reason I had waited so long was because I thought I had to be technically proficient to join. He told me that by joining I could reach that goal much sooner. How right he was.

"I helped Bob on his crime scene book and worked on a few workshops with him.

"Bob quit DOJ in early 1979 because of the way he was being treated and I left several months later. He was a smart guy who had a wonderful BS detector. He didn't suffer fools gladly. He was direct but diplomatic when it mattered. Most people didn't know him but he was an important person in our profession."

Jerry Chisum offered his recollections as well:

"Bob was a fun-loving person. He could always find the humorous side of a situation.

"I played a couple of telephone jokes on him while he was in Santa Rosa. He was gullible but we laughed about those jokes for a long time.

"He would order "Scotch & root beer" whenever we went to a bar at a meeting (BFS & CAC). None of the bars were able to provide the drink for him. He told me the bar didn't have a root beer spigot. I always waited for the bar that had a bottle or can of root beer. Wish I had provided one in advance.

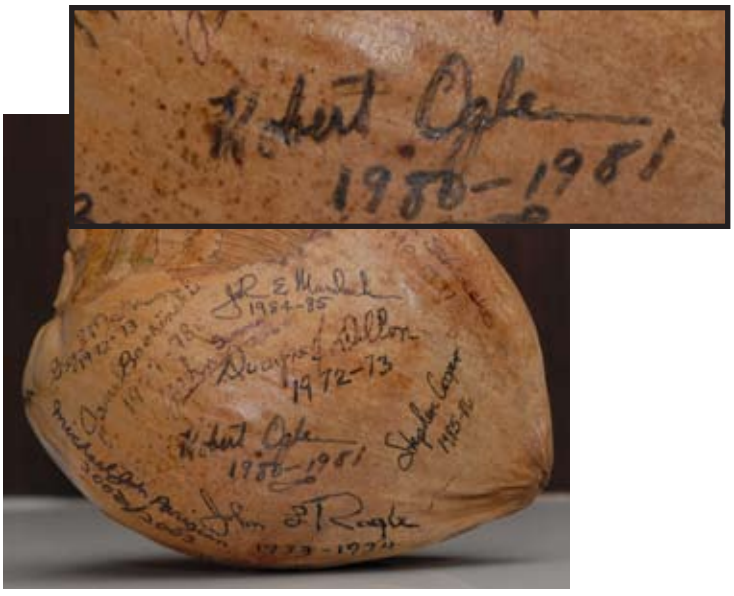
"He was the next CAC president after me so we had some serious experiences together. He presided over an ethics trial that exonerated the subject of wrongdoing at the first Yosemite meeting. Because of the lack of a quorum, we had to "round up" some members and the importance of the subject matter, that trial was a sore point to Bob.

"Bob left DOJ and went with Forensic Associates. I missed him and his humor.

"He had helped me through some rough periods at DOJ.

"He, too, went through some rough times. He almost went completely broke as a private consultant, then got the case in Orange County. During that time he continued to smoke said he would walk a block, then have to sit down as he was so winded. He would sit and smoke a cigarette then walk another block and repeat. He joked from his hospital bed, that he couldn't figure out why he was so short of breath.

"Even though we hadn't been in communication since I retired, I miss him."



A Variety of Thoughts

greg
MATHESON

CAC Editorial Secretary

As our profession matures, more and more of our leaders, mentors and members will be remembered in the pages of the *CACNews*. It is important for our membership to learn about the people who helped pave the way.

Aurora at 3 weeks.

The May 2014 CAC seminar in San Diego was full of interesting presentations, plenty of opportunities to hang out and socialize with friends and colleagues, and an impressive Founders Lecture—or at least that is what I heard. My time in San Diego was limited to the Board of Directors meeting on Tuesday and about 50 minutes of the technical session on Wednesday. I was disappointed to miss the rest of the seminar, but it was for a good reason. At about 9:20 on Wednesday morning I received a call from my wife that our daughter had gone into labor, five days early. Our second grandchild, a beautiful girl, was born the next morning. Everyone did great.

I share this story because it supports the importance of the *CACNews*. I, like many of you, will have the opportunity to read about the meetings we missed and share in the many activities by viewing pictures taken during the course of the seminar. In particular, I am looking forward to reading the print version of the Founders Lecture presented by John Murdock. Without the *CACNews*, the activities of the CAC would not be memorialized in an easy to read and beautifully composed format. (Thank you again, John Houde).

Another important service the *CACNews* provides is remembering and memorializing active and involved CAC members who have passed away. As our profession matures, more and more of our leaders, mentors and members will be remembered in the pages of the *CACNews*. It is important for our membership to learn about the people who helped pave the way. The reality is, this is becoming a regular feature of the *CACNews* and this issue is no different. The way we learn about the passing of former CAC members is haphazard at best and therefore it is highly likely we have, and will, miss people who should be remembered in the *CACNews*. Please do not hesitate to notify me or other members of the board if you are aware of the passing of one of our members.

Over the last several years the people providing the Founders Lectures have changed. The invited speakers are not founders of the CAC, but well respected members of the forensic science profession who have valuable experiences and insights to share with our members. Though I missed his presentation, I had the opportunity to sit across the table from John Murdock at dinner Tuesday night and talk about current activities and remember past shared experiences. I have known John for many years and am well acquainted with his professional life and his contributions to the CAC. Among many other contributions, John is responsible for our solid and much respected CAC Code of Ethics Enforcement Policy. I am looking forward to reading his Founders Lecture.

In the last issue of the *CACNews* my editorial focused on the issue of bias and how my opinion on the issue had changed over the years. The reason I shared this is because I feel very strongly that we as forensic sciences should not be afraid to change our opinion about something if the information, science or evidence supporting our opinion changes or evolves. The feedback I received from the last issue's editorial, (what little there was) focused on the "courage" it took to write what I wrote. Though I was happy to receive the compliments, it is sad to think it is "courageous" to write about a change in opinion. We should all feel free to express our opinions about issues in our field and comfortable to share the evolution of our ideas and opinions.

Enjoy your profession and the many challenges it provides.

Not Just Technicians

Editor,

Congratulations on another outstanding issue of *CACNews*! (2nd Quarter 2014)

I especially enjoyed the reprints of the editorials from the past, *CRIMINALISTICS: An Emerging Profession*, by Jan Bashinski, and *The CAC's Role in Encouraging Professionalism and Professionalized Management; Past, Present, and Future,* by Ed Rhodes. In April 1989 I had just a month previously moved to San Diego from Germany. I had not yet joined the CAC and I missed those missives.

I especially resonated with Jan's and Ed's comments regarding "technicians." Had I been aware of their arguments, I'm sure I would have included them in an email I sent off to a higher up in the FBI laboratory shortly after they had moved into their new facility at Quantico. A writer for a chemistry journal I subscribed to had toured the new lab and interviewed one of the supervisors. Below is my letter, redacted so as to not cause embarrassment.

* * *

I have just finished reading (the article) in the May 2004 issue of (the journal). On the first page (the author), in describing the improvements of the new lab to the old, attributes the following quote to you: "For starters, the laboratories are separate from the offices of the technicians, a luxury not found in the old lab configuration."

If you were misquoted then I apologize for the following diatribe, and my argument is instead with (the writer). Your choice of the term "technicians" is most unfortunate. It is especially unfortunate because of your position and the position of the FBI lab in the world-wide forensic science community. Should the use of this term by an attorney cross-examining a forensic scientist on the witness stand be challenged, all she would have to say in rebuttal is that supervisors in the FBI lab refer to their own staff as "technicians."

You could have instead said "examiners", or you could have said "forensic scientists", or you could even have said "criminalists," (I guess I should be relieved that you didn't say "criminologists"!), but no, you had to use "technicians." I would agree that in the past history of the FBI lab that the term "technicians" might actually have been the most correct choice of terminology. It wasn't too many years ago that the majority of analytical work was done by technicians who reported their findings to "Special Agent Examiners." The technicians didn't testify. Expert witness testimony was provided by the Special Agent Examiners despite the paucity of their scientific background (degrees in accounting or law do not provide the best theoretical background for performing neutron activation analysis). However, in recent years this has changed. The special agent examiners have either retired or they have been returned to the field to do what the FBI does best, investigate bank robberies. You now have a highly qualified staff. Why, a few even have PhD's in chemistry or molecular biology!

Forensic Science for Dummies is the title of a book that was recently published; perhaps I should come out with a pamphlet, "Forensic Science Terminology for the Clueless." Please let me explain the difference between "technician" and "examiner/forensic scientist/criminalist" and why this distinction is important. My motive in doing this has nothing to do with snobbery. In just about all walks of life, and especially in law enforcement, technicians provide essential services. We couldn't do without them. Many police agencies have "crime scene technicians." This is their specialty. Most are highly professional, keep up with advances in their field, belong to professional organizations, attend training seminars, etc. I have the highest respect for them. Because processing crime scenes is their specialty, they do a far better job than the "lab nerds" (I myself am one) who only occasionally get paged at 3 a.m. to respond to a crime scene.

However, there is a very important distinction between "technicians" and "examiners/forensic scientists/criminalists." Technicians on the witness stand are like "Joe Friday" —just the facts. Technicians can only testify to the facts: what time did they arrive; was it raining or clear; what did they see; what did they photograph; what did they collect; how did they package it; etc. Like any other witness in court, a technician has to go through voir dire, but she is not qualified (and recognized by the court) as an expert witness. What's the difference? An expert witness can give opinion testimony (within her field of specialization), while an ordinary witness may not (still not clear on this?—check out the movie, *My Cousin Vinny* and pay particular attention to Marisa Tomei).

So why am I so upset about this? Because I can see the future. I (or some other forensic scientist called to testify for the government) will throughout cross examination be referred to as a "technician," while the defense's expert witness (who happens to be a PhD academician from Harvard who has published a gazillion articles, authored textbooks, won awards, etc., but has no actual forensic science experience) is addressed as "professor," or "doctor." Then the defense attorney will ask the professor about Bayesian statistics and, ala actor Richard Gere in the movie *Chicago,* will begin a fandango (although if the venue is Tyler, Texas, a two-step or better yet a line dance with his two assistants and the defendant might go over better with the jury). So in the end the jury members ask themselves, "Who should we believe, the technician or the professor"? By your choice of that term you not only do a disservice to me, you've also hung that label over every member of your own staff.

/s/ R.B.

* * *

I never received a reply, but when months later I attended a scientific meeting, I noticed that all of the attendees from the FBI Lab had new titles appropriate to their area of specialization. Just as in having to break eggs to make an omelet, sometimes in order to effect change one has to make some enemies.

Back to the *CACNews* issue, I also resonated with Carolyn Gannett's "Quality vs. Efficiency" in her *Ethical Dilemmas* column. The dilemma of the DNA analyst who was not trained in BPA was interesting. At least in that scenario you had someone in the lab who could be called on for the BPA. What if you were aware of an examination that could provide quite important information, but neither you nor anyone else in the lab had the training, supplies, or instrumentation to carry it out? Do you have an obligation to call this to the attention of the investigator? I guess if one were a technician running tests and in order to prevent bias management prevented your having any background information about the case, then you could be blissfully ignorant and have a clear conscience. But would justice and the criminal justice system be served?

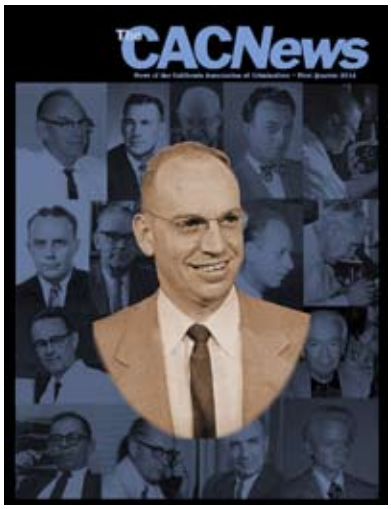
Bob Blackledge

On Bob Cooper

Editor,

I read the article on Robert "Bob" Cooper with interest. [*CACNews*, 1st Q 2014] Bob was one of the nicest criminalists I have known. He was always friendly and helpful to me when I was just starting in the field. Later I saw some things that impressed me how selfless he was in taking care of his employees and honor for the field.

I was the training coordinator for the new Bureau of Forensic Services for the CA DoJ in late 1973. Apparently, the 1973 budget was not good for the Alameda County Crime Lab.



Bob came to see Fred Wynbrandt and me at DOJ HQ in Sacramento. He told us he was having problems with his budget and would have to let some people go. He offered to let DOJ take over services for Alameda County. He would resign rather than have an administrative conflict. We could put in our own manager and supervisor. He just didn't want the staff to lose their jobs. After discussing the concept for a while, Fred encouraged him to apply for funding. He gave him some ideas and pointed out that the monies coming in under the new blood alcohol assessments should benefit the laboratory. Bob apparently followed Fred's advice because the lab continued operations.

Bob resigned from the CAC in 1985 not 1981. I was chair of the ethics committee. We had a complaint about a letter that Bob had written questioning the ethics and abilities of some of our members. During the questioning, we asked Bob about some of the material that was not correct. Bob was obviously embarrassed and said he would rather resign that to pursue the matter.

I was elected president-elect at the 1993 meeting in Berkeley. When new business was called for, I nominated Robert Cooper for life membership. It was seconded by several of the "old timers" including the other founding members present. The vote was unanimous for him to be instated as a life member. He was one of the founding member guests at that evening's banquet.

I hope the membership understands that Bob was a member in good standing for the last decade of his life.

Jerry Chisum

Frank Cassidy listens to a student explain his science fair project at St. Paul's Parish Day School in Ventura (1982).

Goodness Rubs Off

It's said we take away a little bit of everyone we meet. If your're lucky, you meet a person like Frank Cassidy. What I took away, he freely gave: A consistently positive outlook on life and work. I don't think I've ever met someone with less ego. Frank would always be supportive and happily share the limelight with his fellows. He was a prolific author, contributing so many articles to *Tie-Line*, *AFTE Journal* and the *CACNews* that people would just smile and roll their eyes (in a friendly way) when they saw another article. His missives were invariably of a "How-to" nature intent upon helping the bench-level criminalist do his or her job more efficiently.

When I left the DOJ lab in Santa Barbara to pursue my teaching aspirations, I asked Frank to be one of my Science Fair Judges. I knew he'd be encouraging to my seventh and eighth-graders, gently challenging them on their projects and never coming across as aloof. I couldn't have been more pleased. I snapped a photo of the event and it's still a pleasure to see after all these years. I'm so sad to see Frank go, but I'm so glad to have known him.

John Houde

Frank was one of the very good ones, both then and now. Much time has passed, and the distance grows constantly larger.

Frank Cassidy was always a gentlemen. He was the first to collaborate on a problem, sharing information and ideas. But if he disagreed with you, he was still always respectful of you. He was a very careful scientist. He never went beyond what the evidence said. And he brought his considerable engineering skills from his time in the aerospace industry to bear on problems in firearms and toolmark comparisons, and with great success. In that regard, I learned much from him. He carefully documented all that he did, an uncommon practice at the time I knew him. He had a long and very productive career in the crime lab with DOJ. He was happiest when he had a problem to attack that used his knowledge and experience to their fullest. I'll remember him always, a most excellent colleague.

Duane Mauzey

be of benefit to the CAC by stepping up and running for the Board. Little did I know that when I elected to do so that I would be running unopposed for the president-elect position and then being elected by the membership. What were you thinking?

One year later, I was installed as your president one week short of my birthday, thirty-two years after becoming a member. I have arrived again.

I sat in the Board meetings this past year and have learned much from my more experienced and knowledgeable colleagues. Yes, it is possible to teach an old dog new tricks, it just takes a bit longer. I look around the room during board of directors meeting and see very little gray hair around me, though the new president-elect hasn't much hair.

But I want to get to the heart of the matter and now I don't have much space in this message left. So here goes:

1) As you may or may not be aware, the joint CAC/NWAFS meeting with CACLD participation will be held in Rohnert Park in October of this year. It is unbelievable that we have no host laboratory. Instead of going into incriminations, I will say that the duty of hosting that meeting has fallen upon your Board. I will be serving as chair representing the CAC and Trevor Allen will be serving as chair representing NWAFS. While we have some dedicated and talented people on our board working on the planning and logistics of that meeting, I am asking you as members to step up where you can and offer your talents and your expertise to make this meeting a success. We will find a job or position for you. Don't worry about that.

2) ABC and certification. We, the Board feel that we have some responsibility in supporting the American Board of Criminalistics. After all, the CAC was responsible for setting up a criminalistics certification program and worked with the ABC in seeing that it came to fruition. What appears distressing is that in an article written for the CACNews by long time member Dave Stockwell entitled, "Renewing Vows" is a glaring chart that shows that the number of CAC members with ABC certification is dropping. At one time, CAC had the most members represented. In 2013 the MAFS tied the CAC then in 2014 that organization surpassed us. Other organizations appear to be still below us and somewhat static in terms of certified members. I should tell you up front that I hold no certification from the ABC. I had my usual excuses, such as, I am a member of such and such organization, and I have such and such status with such and such organization, and I wrote some of the questions for the certification test for such and such organization, I don't need no stinkin' certification. Well, I think you can see the folly in that way of thinking. So, over the next year and a half I will begin the process of applying for, studying for, and finally taking the ABC exam. Hopefully, I will pass it and be able to add the venerable initials of DABC behind my name. For those of you not yet certified, I hope you will join me and do the same. Perhaps, we will see each other in one of those examination rooms after a CAC meeting. I promise not to look at your test paper when taking the test.

3) At our most recent biannual meeting held in San Diego in May, I listened to a most excellent Founders Lecture given by none other than John Murdock. In it, he listed 9 essentials to being a good criminalist. I am not sure why the number 9? God gave us the Ten Commandments. Our founding fathers gave us the Constitution with the Bill of Rights, which consisted of Ten Amendments, more added later. John was content with just nine. I urge you to read them when they are published. They are insightful and can serve as a valuable guide when you perform your day to day activities in the laboratory.

4) I learned of the passing of Bob Ogle, a past president of the CAC. I did not know Bob personally, but I learned of him and his reputation as a member of this organization. When I was in the process of affixing my signature to the Coconut, I saw his signature. That is when I decided to call his wife Judy and offer my condolences to her and the rest of the Ogle family on behalf of myself and the CAC .

I realize that this was a long first president's message, but I feel that I have espoused the more salient points. My main mission is to advance the cause of forensic science. The way I can achieve this is to ensure that we have a willing and active CAC membership. Thanks ahead of time to those who share my vision in making this goal a reality.

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We received the CAC check (check number 236 dated 8/7/2013) in the amount of $4,000. The UC Davis Forensic Science Graduate Program would like to thank the CAC Endowment Committee for this generous award. We have several graduate students preparing their abstracts for the CAC October meeting in Modesto. We also anticipate using some of the award money to sponsor a bloodstain pattern analysis training opportunity for several graduate students in the fall.

CAC Treasurer Meghan Mannion-Gray shares this thank-you note from UC Davis for the CAC donation.

Up the Ladder and Back Again: Reflections From Someone Who Has Come "Full Circle" During Almost 50 Years in Forensic Science

by John Murdock

Thank you John for your kind introduction.

Mr. President, members of the CAC Board of Directors, fellow members, and guests.

I consider it a real privilege to be given the opportunity to present this lecture.

I am the twenty second person, since 1983, to be offered this opportunity. In preparation, I have done two things. First, I have reviewed all available founders' lectures. Second, I asked all of my colleagues at the Contra Costa County Forensic Lab what they would like to hear that would make listening to me for 45 minutes worth their time.

I received some interesting suggestions, most of which I have included. Some of the other suggestions, such as serving wine and mixed drinks, I decided not to use, because I assumed these would be available later.

After the Senior Girls Dance- 1956- Blue Note Night Club, Chicago, Il.

Half of my lecture will be autobiographical. During the other half, I will discuss nine areas of forensic science that are of special interest to me, and I sincerely hope they will also be of interest to you.

Choices—each of us has the power to make choices. This morning, I am going to describe some choices that I have made.

I grew up and attended high school in the mid-western town of Wheaton, Illinois, 25 miles west of Chicago. I graduated from Wheaton Community High School, without distinction, in 1956. I took every shop class, no college prep courses, and spent my after-school time playing baseball, basketball, and football, but mostly just cruising around in a series of very cool cars and motorcycles. The editorial comment below my class picture is, "Studies bother him not, for he bothers not with studies'. This worked for me, in high school.

In addition to having my Dad for 8th grade math, and as a coach for intermural sports, he taught me how to hunt: squirrels & doves with a slide action .22LR caliber rifle, pheasants with both .410 and 16 gauge shotguns, and rabbits with a club, yes, I said club. Shortly after I graduated from high-school, I got married and began to work construction, as a laborer, concrete finisher, and electrician. After working for several years outside in very cold Illinois winters, and seeing broken-down men in the union labor halls waiting for work, I figured there must be a better way to make a living.

So, in 1960, I enlisted in the United States Air Force and spent 9 months in Jet Engine Mechanic Training School. Since I was a little older than most other enlistees, I was made Barracks Chief. I had the only room in the barracks to myself, and soon learned, through the stories told to me by those in my barracks, how fortunate the three Murdock kids were to have been raised by such wonderful parents.

Standing outside of the barracks, Sheppard Air Force Base, Wichita Falls, TX – 1960

Shortly thereafter, I wrote my parents and told them that I didn't know how they had raised us to have such a healthy sense of confidence and self-esteem, and thanked them for what they had done for us. I am convinced that self-esteem is the greatest gift parents can give to their children.

In 1961, I was sent to Travis Air Force Base in Fairfield, CA. I worked on C130 turbo-prop engines and on SAC B-52 Bombers in engine overall. After seeing the dramatic difference in salary **and** clothing between enlisted personnel and officers, I decided to get the college education I had avoided preparing for in high school.

I sent to the University of California at Berkeley for the Bulletin of the School of Criminology and learned about a profession called criminalistics. My first book on criminalistics was "An Introduction to Criminalistics" by O'Hara and Osterburg, published in 1949. I was inspired both by the book, and the following quote by Daniel Defoe that the author's included "I hear much of peoples calling out to punish the guilty, but very few are concerned to clear the innocent."

After learning what classes I had to take to enroll at UCB as a junior, I began to take them at Vallejo Junior College.

In 1964, I graduated from VJC with an AA degree, was discharged from the Air Force, and began to take Criminalistics classes at UCB under Dr. Paul Kirk. One of my textbooks was the book entitled "Crime Investigation", written by Dr. Kirk in 1953. CAC members have heard about Dr. Kirk during at least four founder's lectures: Pete DeForest in 1997, Jerry Chisum in 2000, Chuck Morton in 2003, and George Sensabaugh in 2012. They knew him in a more personal way than I did. I knew him as a student usually knows a highly regarded professor. Dr. Kirk required attention to detail and correct answers to the numerous unknowns we were required to analyze. His overall philosophy, expressed in the syllabus to Criminology 151, was "In Criminalistics, mistakes are not allowed". If you missed an unknown, you had to do a second one for no more than half-credit. If you missed that one, you had to continue doing unknowns until you got one right, for no credit.

Quality of Work. In criminalistic practice, mistakes are not allowed. Testimony once given cannot be corrected by giving it a second time. For this reason, it will be the policy in this course to give full credit only to those exercises which are correctly reported the first time. If the exercise is incorrectly reported, a second unknown may be obtained, which will be different from the first and when this is satisfactorily completed half credit will be given. If this is incorrect also, no credit is possible on that exercise even though the exercise will still be required of the student. For this reason, great care should be exercised to be certain of the results before reporting them.

"Quality of Work" statement by Dr. Kirk in syllabus to Criminology 151, circa 1964

Dr. Kirk also wrote a book in 1949 that you may not be familiar with. It is entitled "Quantitative Ultramicroanalysis." On page 291, you can see his reference to the Manhattan Project. From 1942 to 1945, Dr. Kirk worked on the Manhattan Project at Lawrence Radiation Lab in Berkeley, and research facilities in Chicago and Washington State, separating plutonium metal for the Atomic Bomb. He also authored over 200 articles in biochemistry and forensic science.

At the end of an article about Dr. Kirk in the November 1964 issue of *UCB California Monthly*, he is quoted as saying "Some of my colleagues object to the fact that I've always shot off my mouth in an effort to say what I think. Well, any field has to have some people who stick their neck out. Otherwise there isn't much progress." I like this philosophy and, as I look back on my career, I find that I have conducted myself in much the same way. I encourage you to do the same.

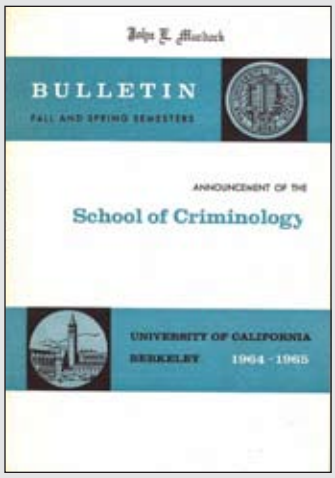
(left) The author using a chemical balance in UCB room 2590 LSB- 1967.

(below) Dr. Kirk's teaching laboratory- room 2590 Life Science Building, UCB Campus, 1967.

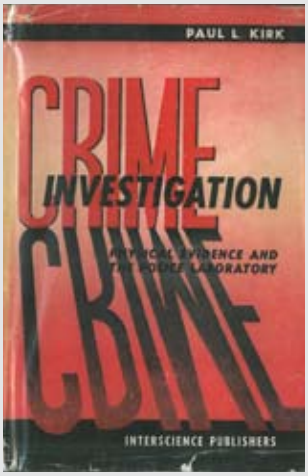
Dr. Kirk's students worked very hard & spent long hours in the lab—room 2590 Life Science Building. Here it is in 1967, and here I am weighing something in connection with solving an unknown.

I graduated with a BS degree in 1967, and, although I was advanced to candidacy for the Doctor of Criminology degree, I settled for a master's degree in 1977, because I didn't think that my Masters project was worthy of a doctorate.

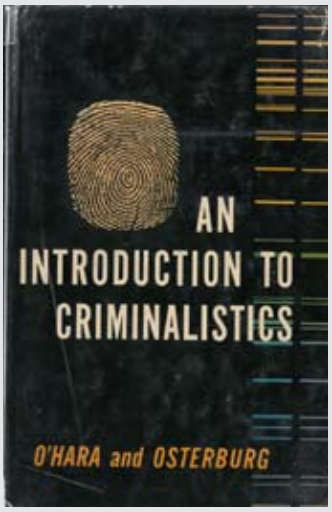
I was employed at the Contra Costa County Crime Lab as a student worker in 1966, and became a criminalist in December of 1967. During the next 12 years, I progressed to the top



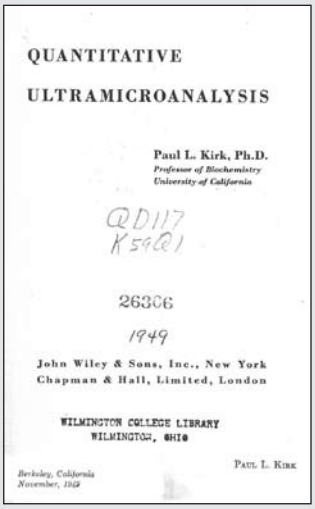
UCB – School of Criminology- Bulletin 1964-65



"Crime Investigation" by Paul Kirk - 1953



"An Introduction to Criminalistics" by O'Hara and Osterburg - 1949



Title page to "Quantitative Ultramicroanalysis" by Paul Kirk – 1949

OUTLINE OF LABORATORY WORK IN CRIMINOLOGY 151 A-B

A flexible curriculum is provided, in which the regular student may survey the broad field of identification of evidence, and the special student can emphasize more intensively those subjects of greatest interest. All of the exercises provided are intended to instruct in some technique of identification of physical materials encountered as evidence in criminal investigation. Because of the great breadth of the field, and limitation of equipment, not every exercise may be completed by the student, and often only one or two students may work on any given exercise at the same time. There is no absolute routine to be followed, but all work is staggered to take full advantage of available equipment and allow for special interests.

The initial, required work for all students consists of elementary training in chemical microscopy, i.e., chemical identification of materials by use of the microscope. This is followed by study of the physical properties that are especially valuable for identification and finally by the use of the microscope, other instruments, and special chemical tests in the identification of various materials of criminalistic importance, e.g., hairs, fibers, glass, paint, blood, inks, papers, poisons, etc. Because the course extends over two semesters, the students, in general, will leave blood and poisons to the second semester along with other exercises which he does not complete for lack of time during the first semester.

All students are expected to perform certain supplementary and special problem work as discussed below and elsewhere in this syllabus. All students will be expected to cooperate in the collection and comparative study of various types of materials used for reference purposes.

Requirements: All students will be expected to complete a minimum amount of chemical microscopy, Exercises 1 to 4 inc. Each unknown must be tested for the presence of a new cation and a new anion whose presence or absence must be determined. Other ions present will carry credit if identified correctly. Proof of absence of all required cations or anions, respectively, will be considered equivalent to proof of presence of one of them.

In addition to the above requirement, Exercise 20 will be required of all students. From appropriate remaining exercises, enough additional work will be selected to complete the necessary number of points for the course.. Each exercise carries a definite number of points, and the student is expected to complete at least 45 points to pass the course. Additional points serve to improve the grade.

Grading. One half or more of the course grade will be determined by the amount and quality of laboratory points accumulated. One quarter will be determined by the final examination, and the remainder by reports on special problems, technique grades and similar considerations. Since the student will follow no regular time schedule, he must exercise every precaution not to allow the laboratory work to lapse.

Unknowns will be issued by the assistant as needed, in general within 24 hours after the student makes a request for one on the 3 x 5 in. cards provided.

Reports on the findings with unknowns must be submitted also on the same type of card.

Collecting. Students will be expected to contribute a complete set of hairs, including crown, underarm, pubic, eyebrow, and whatever other hairs are available, such as leg and chest hairs, etc. These should be pulled, not clipped, except that combings may be used for crown hairs, and at least a hundred of the latter should be included. In addition, anything of criminalistic importance that may be available to the student should be collected and delivered to the museum stock. The nature, history, and other pertinent data on all materials collected should accompany the specimens.

Supplementary Work and Special Problems. Special work additional to routine exercises is expected to be made a part of this course. The work may take the form of scheduled demonstrations of an original nature, or it may involve special problems, or other activities designated by the instructor. Both point credits and a grade will be assigned to such activities and will aid in determining the final grade of the course.

Quality of Work. In criminalistic practice, mistakes are not allowed. Testimony once given cannot be corrected by giving it a second time. For this reason, it will be the policy in this course to give full credit only to those exercises which are correctly reported the first time. If the exercise is incorrectly reported, a second unknown may be obtained, which will be different from the first and when this is satisfactorily completed half credit will be given. If this is incorrect also, no credit is possible on that exercise even though the exercise will still be required of the student. For this reason, great care should be exercised to be certain of the results before reporting them.

"Quality of Work" statement by Dr. Kirk in syllabus to Criminology 151, circa 1964.

position of criminalist. During these 12 years as a generalist, I worked on forensic biology cases, built our first electrophoresis tanks at the DOJ lab in San Bernardino, examined trace evidence, and did a lot of firearm and toolmark examinations.

I also processed numerous crime scenes. In addition, during these 12 years, I was a keen observer of supervisory and management practices. These observations proved important as I moved up the career ladder.

I joined the CAC in 1968 and AFTE in 1969, the year it was formed.

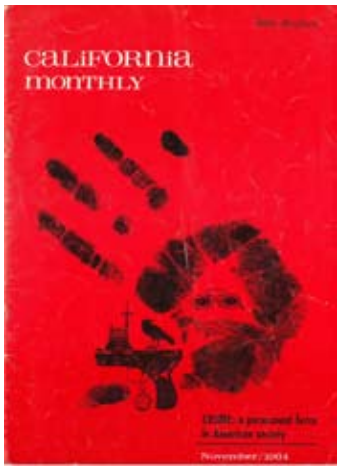
I was supervising criminalist for about 5 years, through 1983. I enjoyed this position because the lab director gave me the freedom to supervise without micro-managing. My supervisory philosophy was that while I didn't expect everyone to be at their best every day, I expected each person's overall performance to be above average. I also banned the use of the phrase "consistent with", because without explanation it is meaningless. So, just explain what you mean, and omit the phrase "consistent with."

CHAPTER 10

Physical Methods

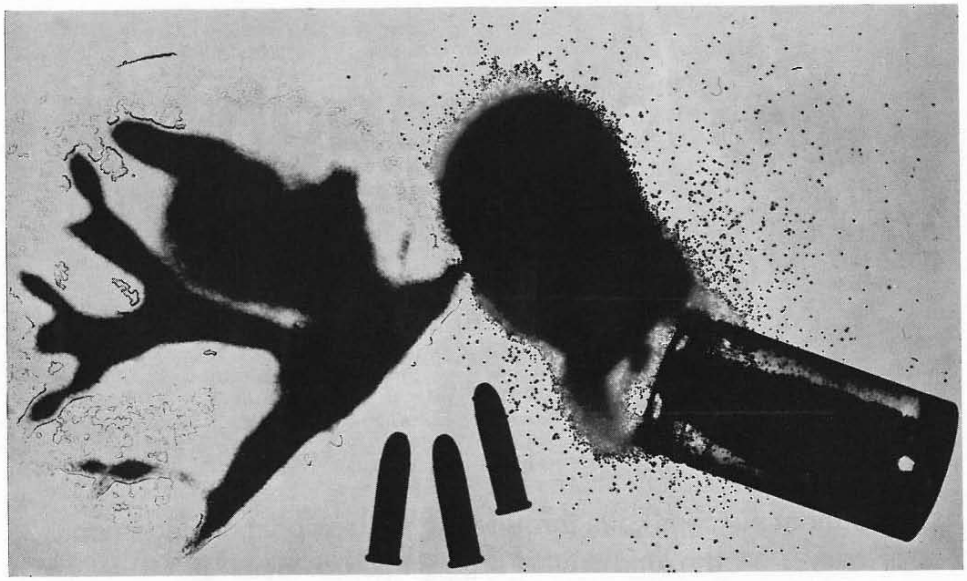
In the field of microgram chemistry it is necessary at times to determine the physical constants of very small quantities, though not necessarily as a portion of a direct quantitative analysis. Many compounds have been prepared in microgram quantities in connection with the study of the chemistry of the transuranic elements, the details of which may be found in specialized publications of the Manhattan project. In order to study these small preparations, many physical constants were determined, thereby demonstrating the utility of well-established techniques when applied to new problems. In the field of biochemical microgram analysis it is often equally desirable to determine physical properties. Such procedures as the determination of melting points, boiling points, refractive indexes, and density have been used routinely with milligram quantities for many years. Their application to microgram quantities requires merely the adaptation to the smaller amounts, and some of these adaptations also are standard procedures that have been employed in some laboratories over considerable periods of time. Here are discussed some of the alterations in standard technique which are necessary when the quantity of material is so small as to preclude the use of conventional procedures.

First page of Chapter 10 from "Quantitative Ultramicroanalysis" with reference to the "Manhattan Project"



Cover of November 1964 issue of UCB California Monthly

Spots of Blood, Bits of Metal, and Traces of Powder



a portrait of Paul L. Kirk whose hobbies are crime investigation and criminalistics

JUST INSIDE the northwest entrance of the Life Sciences Building on the Berkeley campus, behind a door marked 2590, is located one of the few university laboratories in the world for research in the forensic science, criminalistics, that plant being a repository for a varied assortment of materials—inks, burnt out generators, spots of blood, strands of hair, barbiturates, swatches of lipstick, beakers of contaminated dry cleaning fluid, cans of house paint, splinters of glass, a hammer, a file, a box of bullets, test tubes, a vacuum cleaner, light tables and photographic equipment. In 1934, when Paul L. Kirk opened the laboratory and began experimenting and instructing there, techniques for collecting and interpreting data on substances that might constitute physical evidence in crimes (almost anything) were in a relatively primal state. Today, this man who has pioneered in the application of the principles of the physical sciences to crime detection, believes that with all the many efficient tools that have been developed in the interim, "progress in criminalistics has been technical rather than theoretical, transient rather than permanent." Remedying this situation and gaining recognition for the science of criminalistics has been his personal crusade — and in the struggle he has summoned many resources, the most considerable of these

For the next 10 years, through 1993, I was the Lab Director of the Contra Costa County Lab. I took what I thought were the best management traits I had seen, vowed never to use the poorest traits I had seen, and settled into being Director. I also enjoyed this position, mainly because I worked for a Sheriff, Richard Rainey, who also did not micro-manage, and was a solid supporter of Forensic Science.

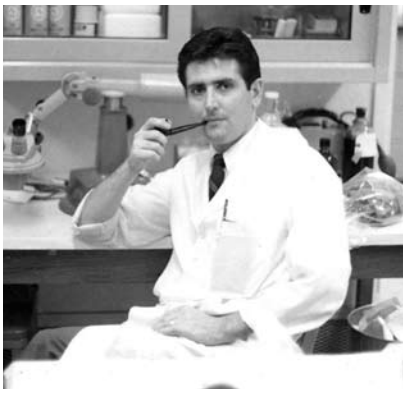
When I went to Sheriff Rainey in 1984, and asked his permission to run for President elect of CAC, he listened patiently while I explained about the impact that being CAC President and a member of the Board of Directors would have on my County job. All he said was, "John, I am not concerned with the impact because I am confident that you will achieve the proper balance, but if you become CAC president, I ask only one thing, that you do the very best job you can." In this way, Sheriff Rainey was very much like Dr. Kirk—I respected him and worked hard to live up to his stated expectations. I am very fortunate because in my professional life I have become associated mostly with professionals like this. I, in turn, have worked very hard to also be a person who tried to provide what others needed, and then stayed out of their way, unless asked for help.

During my time with Contra Costa County, I taught "How to Process Crime Scenes" for about 21 years at Napa and Diablo Valley College. From 1990 through 1997, I taught "Criteria for the Identification of Toolmarks" at CCI with Al Biasotti. In 1995, Al and I were invited to write a chapter on Firearms Identification for "Modern Scientific Evidence - The Law and Science of Expert testimony". Our chapter was published in 1997, and contained, for the first time, recommended quantitative criteria for the identification of striated toolmarks, referred to as "QCMS", quantitative consecutive matching striae. Seventeen years later, this criterion is still valid. When Al passed away in 1997, two weeks before the two volume Modern Scientific Evidence set was delivered to his home, I continued to teach the Toolmark Criteria course with other CCI staff. In 2005, Bruce Moran started to team-teach this class with me. We still present this class at CCI, and other places around the world.

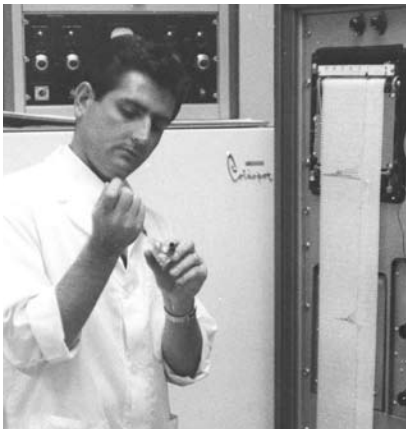
From 1986 to 1993, until I retired from Contra Costa, I was a member of the county Toastmasters club. Joining Toastmasters is one of the best things a forensic scientist can do for themselves, both professionally & personally. Toastmaster's helps you develop easily learned skills to enhance the quality of your oral communication, both in court, and out. You might produce the highest quality casework, but if you are unable to effectively verbally describe what you did, and defend both your results and the propriety of your forensic specialty in Admissibility Hearings, you limit your effectiveness in "speaking for the evidence", as Bruce Moran would say, because less weight will be given to your testimony.

As lab director at Contra Costa, I spent 10 years in the American Society of Crime Laboratory Directors (ASCLD). During this time, I witnessed the development of the ASCLD-LAB Accreditation Program. I believe that this program has been good for forensic science in the United States. I know that you have heard some disparaging remarks about this program during other Founder's Lectures. Some feel that it has stifled creatively and scientific curiosity.

So, in preparation for this lecture, I interviewed Supervisors and Managers at Contra Costa and I agree with their assessment that while accreditation has not stifled scientific curiosity, it has caused less time to be available for research because of the record keeping and audits that are required. Some sections of the laboratory, like DNA, are much more affected than others. I encourage each of you to learn about Lab Accreditation, and read the fine print, so you can explain it thoroughly in court. Today's ISO-Accreditation helps ensure accurate lab results, which, collectively, should be one of our main goals.



The author at the Contra Costa County (CCCO) Crime Lab, Martinez, CA- 1966



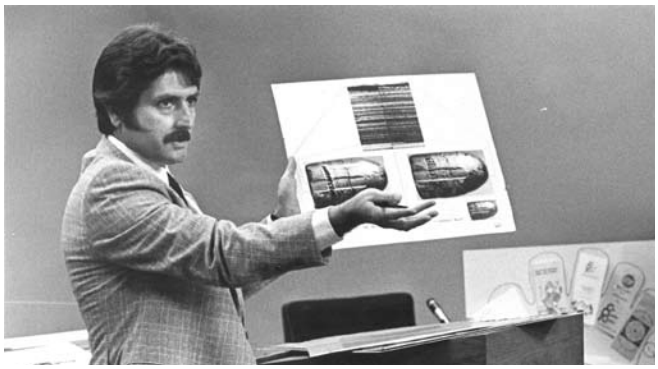
The author in the CCCO Crime Lab- 1966

The author, Duayne Dillion and Jerry Mitosinka at CCCO Shooting Range - Semi-Auto Pistol ejection patterns - 1969

I retired from Contra Costa County in March 1993, took a one week motorcycle trip to visit Ken Goddard at the National Fish and Wildlife Forensic Laboratory in Ashland, Oregon, and promptly **returned to the bench** as a Firearm and Toolmark Examiner for the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) at their laboratory in Walnut Creek, California.

ATF is a large organization with three crime labs nationwide. Their service area was, and still is, large, so I got to travel, which I enjoyed. I helped design the curriculum for the 12 month ATF National Firearm Examiners Academy (NFEA) and taught there for 5 years. I still evaluate all written assignments for the NFEA three month long Phase One. Since ATF investigates bomb cases, I got a lot of non-firearm toolmark case work experience during my 15 years there.

Examining Bolt Cutter Toolmarks in CCCO Lab - 1980



Presenting Training on Firearms Identification - 1979

I retired from ATF in 2008, by combining my 15 years there on the bench, with four years of Air Force time, for a total of 19 years of Federal Service. In 2008, I formed my own company, John E. Murdock & Associates – Forensic Consultants, LLC, and currently work full time on a contractual basis as a Firearm and Toolmark examiner with Contra Costa County.

I feel very privileged to work in the laboratory where I started, 48 years ago. Our laboratory has just moved into a much larger renovated facility and achieved ISO Accreditation.

I work in the Comparative Evidence Unit with a hard-working, very talented, group of examiners. Please note the crossed "Tribute Swabs" in the foreground. It is our humble way of paying tribute to the Gold Standard of DNA. We take

6/9/89 - Contra Costa Times

Firearms expert solves murders with microscope

Contra Costa official often gives key testimony

By Robert Oakes
Staff writer

John Murdock focused a microscope and peered at tiny nicks and scratches on a 9mm cartridge casing linked to the murders of three Los Angeles prostitutes.

Murdock, director of the Contra Costa Sheriff's Department criminalistics division, had been summoned to the Los Angeles Police Department firearms laboratory. His assignment: Examine the cartridge and three bullets taken from the murder victims.

According to police department tests, the gun that fired the bullets and cartridge belonged to a Los Angeles County sheriff's deputy.

The case — a cop accused of three murders — made national headlines.

Deputy Rickey Ross had been sitting in jail since Feb. 23, facing three counts of first-degree murder.

It was May 10. Murdock sat in front of the microscope, re-examining the only evidence connecting Ross to the killings. Murdock looked closer.

"He has an absolutely sterling reputation among firearms examiners in the western United States"

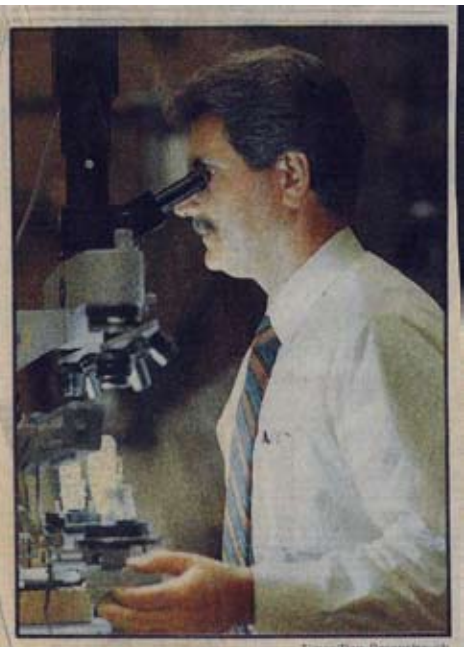
— LA County deputy district attorney

He saw the tests were wrong.

"This guy could have been convicted. He could have been executed," said Murdock, 50, an expert in the tedious, meticulous science of identifying the distinctive marks a gun makes on bullets and cartridges.

A judge dismissed the murder charges after Murdock and Al Biasotti, a California Department of Justice firearms examiner, announced their results. Los Angeles police say Ross remains a suspect.

Please see **MURDOCK,** Page 2A



Times/Dan Rosenstrauch

JOHN MURDOCK looks through a special microscope that shows two bullets side by side.

MURDOCK: Helps solve major crimes

From Page 1A

The Los Angeles investigation was one of several high-profile criminal cases in which Murdock has provided key evidence.

He testified at the trial of Claude Dallas, a self-styled "Mountain Man" who gunned down two Idaho game wardens in 1981. The case was featured in two books and a television movie.

The game wardens were shot first with a .357-caliber Magnum revolver and then with a .22-caliber rifle. Dallas and another man at the murder scene carried identical revolvers. The rifle belonged to Dallas.

When an Idaho firearms examiner and a federal firearms examiner disagreed about which revolver fired the shots, Murdock was called. He went to Idaho and testified the game wardens were shot with Dallas' revolver. Dallas was later convicted.

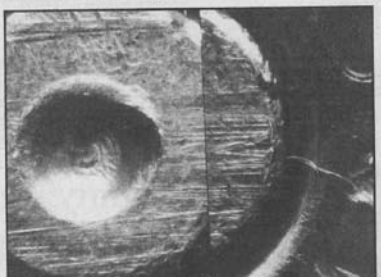
Murdock also testified at the trial of Diane Downs, an Oregon woman accused of shooting her three children, killing one and seriously injuring the others. Downs claimed a stranger shot the children.

When prosecutors wanted an expert to double-check that the .22-caliber bullets came from Downs' gun, they called Murdock. Downs was convicted in 1984.

Puzzle solving

In the Los Angeles case, when defense lawyers raised questions about the police department tests, prosecutors agreed the data should be re-examined by two experts: Murdock and Biasotti.

The triple-murder case collapsed for prosecutors. Nevertheless, William Hodgman, a Los Angeles County deputy district attorney, was impressed by Murdock.



Times/Dan Rosenstrauch

TWO GUN cartridges — one taken from the scene of a crime and the other test fired from a suspected weapon — show similar markings or striations.

"He has an absolutely sterling reputation among firearms examiners in the western United States," Hodgman said. "I would be happy to use him any time."

Biasotti, who has known Murdock for 20 years, worked with him on the Dallas case and other projects.

"John is an excellent scientist," Biasotti said.

Murdock, a 23-year veteran of the Sheriff's Department, was an Air Force jet mechanic when he heard about scientific crime detection. He later earned a master's degree in criminology from UC-Berkeley.

"Being able to apply the techniques of science in the investigation of crimes is basically just puzzle solving. I enjoy doing that. It's a nice intellectual exercise," Murdock said.

Most of the bullets and cartridges Murdock examines come from murders, assaults and other violent crimes. Murdock would rather forget some of the crime scenes.

"We've got a job to do and we do it, but it's difficult," Murdock said. "You walk into a house at Christmas and you see the tree and all the presents spattered with blood because some guy just opened up his new gun and wasted his wife. Those cases are just awful."

A subjective science

Murdock's specialty is firearms identification. He decides if a gun, and no other gun, fired bullets or cartridges.

It is, he said, a subjective science.

A gun makes several kinds of marks on bullets and cartridges. For example, when a gun is fired, an explosion in the cartridge forces the bullet out of the barrel. The base of the cartridge slams against the breech of the gun.

Lines or grooves, called striations, are made on the cartridge.

A murder cartridge may have some striations in common with a cartridge test-fired from a suspect's gun. An examiner must decide if there are enough common marks to prove the gun was the murder weapon.

"There is no set number of lines that have to match. It's all based on experience," Murdock said.

In the Los Angeles case, police examiners saw some similar marks on the murder cartridge and cartridges fired from Ross' pistol.

Murdock saw the similar striations, but he also saw a difference.

The firing pin on Ross' gun made a distinctive mark. The murder cartridge had no such mark.

The LAPD examiners were under pressure and they may have rushed their tests, Murdock said.

For the past 19 years, Murdock has taught a Diablo Valley College course about preparing evidence for crime labs. He wants to make sure crime scientists do their jobs carefully.

Murdock said he demands such care from his staff at the sheriff's criminalistics division.

"What happened in LA shouldn't happen. What we do here (in Contra Costa) is make sure we provide first-class work to prevent that kind of thing from happening."

Newspaper articles on the Firearms Identification in the Ricky Ross Case -1989

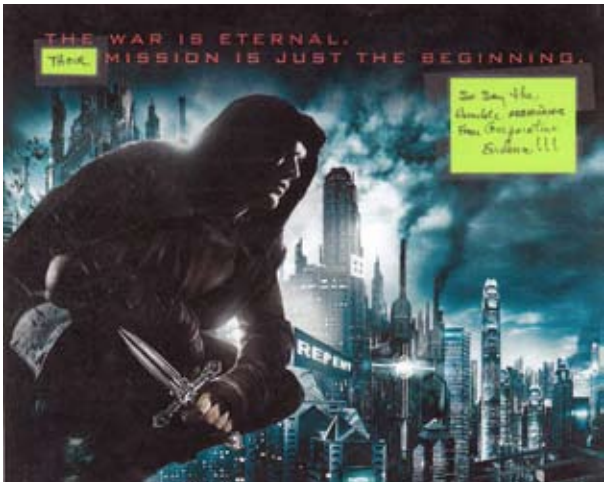
our work seriously, but still have fun by making our own captions for heroic illustrations. Here are two of them. We may be physically present in the laboratory, but mentally we are on the roof tops, watching out for the citizens of Contra Costa County!

Our Supervisor, Chris Coleman, is here, and is now CAC president-elect.

Being up in years, or as John Thornton would say, circling the drain of life, I take some respectful kidding. Once, during a lab tour for some high school students, the tour guide pointed first to me, and then to an old court display of firearm muzzle-to-shirt distance determination. The shirt in the display was dark blue, almost black, police officer uniform material. The tour guide said that the display consisted of portions of the "greatcoat" worn by US President Abraham Lincoln when he was shot at Ford's Theater,

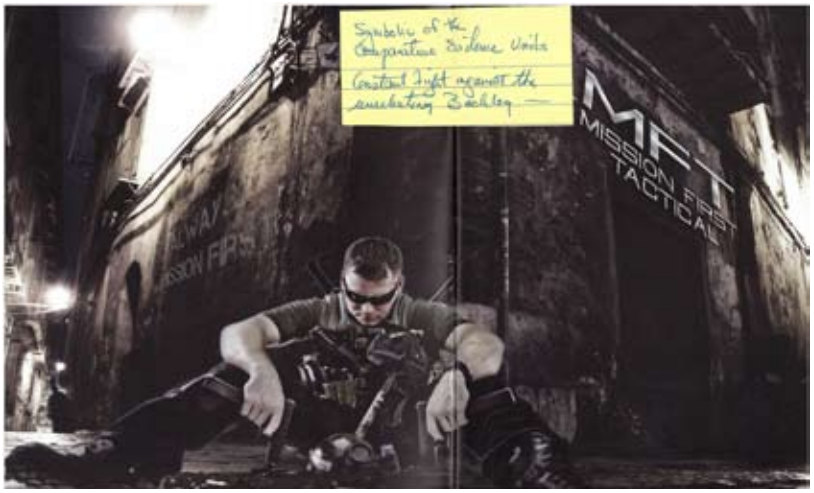
The author and colleagues- Contra Costa County Sheriffs Crime Lab, Martinez, CA - November 2010, featuring crossed Tribute Swabs in foreground (their humble way of paying homage to DNA, the Gold Standard)

The author and Sarah Walbridge-Jones with the ATF Mobile Crime Lab in Los Angeles - Circa 2007



Contra Costa Comparative Evidence Unit caption for a heroic Illustration

An illustration of "The Battle of Blacknell", A 402 Administrative Hearing on the admissibility of firearms identification, Martinez, CA, 2012



Contra Costa Comparative Evidence Unit caption for a heroic Illustration

The author, hands in pockets, contemplates processing a homicide scene - 1973

Body dumped on lot

Man slain in Pittsburg

By HARRY STOECKEL
Ledger Staff Writer

PITTSBURG — An unidentified man, an apparent homicide victim, was found dead near in the old South Canonry here this morning.

Police said the man appeared to have been shot in the back, transported to the scene wrapped in a blanket, and dumped in a grassy lot on the east side of the vacant canonry. The body was found here on East First Street.

Shortly after 8:30 a.m. by a resident of East First Street as which the canonry fronts near Cumberland Street.

Found on the body was a ticket punched which was fastened on the dead man's wrist.

Speculation by some investigators is that the victim, a black man, was removed from a vehicle in a blanket, but slipped from the blanket near the curb on East First Street.

Shortly on the street near the curb was recovered in a direction toward where the body was found behind a small tree in the lot, indicating the body was dragged there. The blood-blanket was found near the curb. The man apparently died last night or early this morning.

Investigators continued the possibility the man may have been from another community and transported to Pittsburg.

INVESTIGATING DEATH — John Murdock of the county crime lab put a blood-stained blanket found at the scene of an apparent homicide in Pittsburg in a plastic bag. The body of an unidentified man, shot in the back, was found next to the old South Canonry in background.

McGovern wins 'big'

MILWAUKEE, Wis. (AP) —

Sen. George McGovern said a victory today that "it's [illegible] we'll go all the way" to the Democratic presidential nomination, while one of Wisconsin [illegible] Sen. Hubert H. Humphrey, discounted his defeat on grounds it wasn't a clear test [illegible] Sen. Edmund S. Muskie [illegible], who lagged last fourth place in Wisconsin's primary election Tuesday behind McGovern, Alabama Gov. George C. Wallace and Humphrey, said he thinks the national campaign now is a toss-up.

"I think I'm a strong [illegible] under," Muskie told a news conference. "We've decided

See PRIMARY Page 10

Ber

MARTINEZ — A [illegible] between representatives of the Department of Interior [illegible] residents of Bethel Island [illegible] held here Monday to try to resolve differences [illegible] guidelines for dock and [illegible] construction on Bethel Island.

The Bureau of Sports Fisheries and Wildlife of the Department of Interior recently issued guidelines for Bethel Island. The Army Corps Engineers reportedly using the guidelines in deciding whether to [illegible]

—Photo Courtesy Oakland Tribune

CLUE SEARCH—Contra Costa County criminologist John Murdock examines a pole damaged by blasts shortly after dawn. All three cables on the pole were damaged. After authorities finished their inspection, telephone crews were allowed to begin restoration. (More photos on page 3.)

Cables Blasted In East Bay Hills

Pacific Telephone has beefed up security of its outside plant facilities in the wake of a series of dynamite attacks on both Pacific Telephone and Pacific Gas & Electric Co. in the East Bay hills over recent weeks.

Protection is being provided by air patrol and armed guards.

The attack on Pacific came at 2:35 a.m., Friday, March 22, when two nearly simultaneous explosions caused damage to three aerial cables and one underground cable in the Berkeley Hills near Grizzly Peak.

Major effect of the bombing was to disrupt service between Contra Costa County and the San Francisco-Oakland MMU routes, plus MMU routes within the county.

Although East Bay plant crews, along with supervisory personnel, were on hand within an hour, it was not until after 8 a.m. that they were permitted into the area.

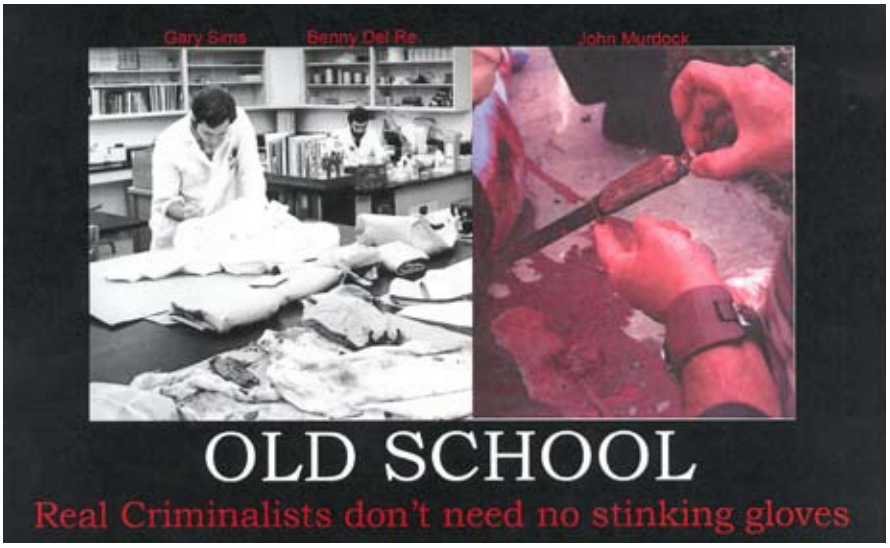
That was because the FBI, and other investigative agencies scoured the hillside for clues and to ascertain that it was safe.

Restoration efforts were hampered slightly by a rainstorm that evening, however, repair work was completed by Sunday, March 24.

(top, r)The author collects bloody blanket near homicide scene, Antioch, CA - 1972

(left) The author examines a telephone cable destroyed by dynamite - 1968

(right) The author removes knife from stabbing victim without wearing gloves



Not wearing gloves when removing knife causes colleague to prepare this illustration.

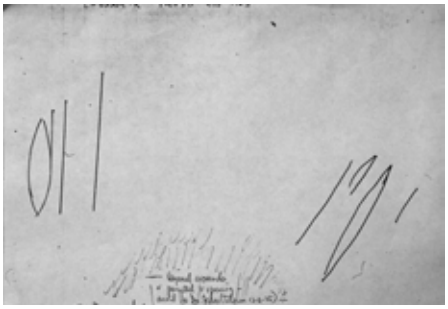
Homicide Scene in Pittsburg, CA (1975)

Residence of Homicide Victim

Victim with hatchet between legs

Hatchet wounds

Hatchet left at scene



Template of wounds prepared by the author to be used for blood "cast off" experiments to determine if questioned blood patterns were from left or right arm swings, or both

The author and Marty Blake heat up Murdock's blood to body temperature in sauce pan

Bed covered with white paper

Walls and ceiling covered with white paper

(Next 4 photos) Sequence of swinging for blood cast-off experiments

Sequence of dipping hatchet into Murdock's blood - template placed over plastic covered sponge over wood block

View of bed with a "cast- off" pattern of blood on surface

View of ceiling & wall with a "cast-off" pattern of blood on surfaces. It appeared that both left and right arm swings were used

and that I had processed the crime scene—to which **several** students exclaimed—How cool is that!! It would seem that, at least in their high school, little emphasis is put on US history.

I also do private cases, some of them for the Innocence Project in Illinois. I have also defended the field of Firearm and Toolmark Identification in several major firearms identification Admissibility Hearings over the past few years. One of them, the Blacknell case, took place in Contra Costa County. Here is the Comparative Evidence Section view of this case, that we call "The Battle of Blacknell." Another, the McCluskey case, took place in Albuquerque, New Mexico. Here is the cover page for the Motion to Dismiss the firearms identification evidence. There were about 80 references attached to this motion, and I had to answer questions about most of them. My entire testimony in this case can be found on the SWGGUN web site under "Admissibility Resource Kit".

I would like to turn your attention now to what I consider to be nine very important General Professional Responsibilities, and offer comments on each. Here are the first five.

1. Read historical literature about forensic science, and keep current on the literature in your forensic specialty.

2. Produce quality case notes and laboratory reports.

3. Present effective testimony, and advocate only the propriety of your casework.

4. Learn Crime Reconstruction.

5. Participate in research and write technical articles.

6. Prepare for 402/ Daubert Admissibility Hearings.

7. Join relevant professional associates and volunteer for committees.

8. Participate in Editorial Review.

9. Learn and teach the ethics of Forensic Science by using Ethical Dilemmas.

1. Read historical literature about Forensic Science, and keep current on the literature in your forensic specialty.

Reading historical literature about Forensic Science makes it come alive, and gives the reader a real sense of belonging to a profession. "Century of the Detective" and "Crime and Science" by Thorwald would be a good place to start.

With regard to keeping current, when I was lab Director at Contra Costa, I encouraged reading of professional literature by requiring everyone to record their reading in a training notebook. Entries were red-lined and dated following each annual evaluation. When the next annual evaluation came around, I expected some new entries to be present below the previous red line. Lab Supervisors and Managers should allow a certain amount of lab time for keeping current with the literature. But, as professionals, we are expected to also read some professional literature during our "off" time. Keeping current is a two - way street.

2. Produce Quality Case notes and Laboratory Reports.

It is my opinion that you should produce case notes of such quality that you are offended if they are not discovered and reviewed by opposing council. You should be so proud of your case notes that you could bring them to a professional meeting such as this, set up a table outside of the meeting room, and display them to your colleagues. They should be through, and contain complete reasoning for conclusions reached. Saying, for example, that no subclass influence is present on a tool working surface is inadequate without an explanation of what is present on that surface to justify your conclusion. Photomicrographs are mandatory when what you conclude is based on what you see. In this age of digital photography, there is no excuse for not taking photographs.

Your lab reports should stand alone such that they should explain the strengths and weaknesses of your analysis so completely that, if needed, your report could be introduced in court without accompanying testimony from you.

Whenever possible, meet with the attorney(s) that intend to call you as a witness so you can explain the best line of questions that will bring out the significance of your casework. If you meet alone with opposing council (Public Defenders for example) to explain your casework and report, they might want to present hypotheticals to see if they are supported by your examination results. I encourage you to respond candidly to these questions, but under no circumstance should you reveal to the Attorney(s) that will be calling you (deputy district attorneys for example) what hypotheticals were discussed, because this could reveal some defense strategy. Contra Costa County criminalists have conducted themselves in this fashion for years. As a result, even though this conduct is not appreciated by some deputy district attorneys, the criminalists enjoy a good working relationship with the public defender's office, which I think is important.

3. Present effective testimony and advocate only the propriety of your casework.

I have described the beneficial effects of Toastmaster training. If you take this training, you will still be nervous before testimony, but you will do such an impressive job of presenting your testimony that it will be viewed as trustworthy, and accorded great weight.

Have no professional interest in the outcome of any case in which you testify. Do not participate in any celebration after a verdict is returned. We develop truths about physical evidence; courts dispense justice, sometime with complete disregard for the truths we develop. It is their right to do this, and is no reflection on the information you have developed and are prepared to present, or have presented, in Court.

Persons accused of crimes have every right to be represented by skilled attorneys that are able to subject expert witnesses like us to probing cross examination. If you are offended by being treated this way, I suggest that you get another job.

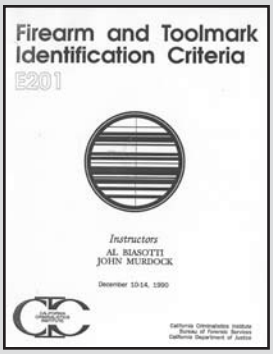
4. Learn Crime Reconstruction.

In the past several years, there have been several books written on Crime Reconstruction. One that I would recommend, entitled "Crime Reconstruction", published in 2007 and revised in 2011, is by Jerry Chisum and Brent Turvey. Three chapters are especially good. One, by Chisum and Turvey, gives a brief "History of Crime Reconstruction", one by Bruce Moran deals with "Shooting Incident Reconstruction", and one entitled "Crime Reconstruction- Ethos and Ethics" by John Thornton explains the thought processes involved in crime reconstruction. John says that "it is the story, rather than the evidence, that will be applied to the ultimate determination of justice". Of course, it is the evidence, properly documented, collected, analyzed and interpreted, that forms the basis of the story. John Thornton's chapter is a must-read for anyone doing crime reconstruction.

A second recommended book, published in 2006 by Luke Haag and revised in 2011, now authored by both Luke and Mike Haag, is entitled "Shooting Incident Reconstruction". It is a highly regarded treatment of this specialized forensic area.

Peter DeForest, in his 1997 Founder's Lecture, stressed recapturing the essence of criminalistics by working with investigators at crime scenes to do crime reconstruction.

(far left) Dilbert Comic Strip- 10-16-13, with slight alterations by Comparative Evidence Unit



(left) Cover page for CCI Course E-201- "Firearm and Toolmark Criteria" - December 1990

(middle far left) A six-statement list of "Maintenance of a Proper Ethical Stance" from page 138 of a 1998 draft of a book by John Thornton.

John I. Thornton 138

Maintenance of a proper ethical stance *

One simple device, perhaps even verging on a gimmick, that may assist the forensic scientist in the maintenance of a proper professional stance against external pressure is a printed statement of ethical behavior posted conspicuously in the laboratory, office, and most certainly in the reception area. This may read:

1. As a practicing forensic scientist, I pledge to apply the principles of science and logic and to follow the truth courageously wherever it may lead.
2. As a practicing forensic scientist, I acknowledge that the scientific spirit must be inquiring, progressive, logical and unbiased.
3. I will never knowingly allow a false impression to be planted in the minds of anyone availing themselves of my services.
4. As a practicing forensic scientist, it is not my purpose to present only that evidence which supports the view of one side. I have a moral responsibility to ensure that everyone concerned understands the evidence as it exists and to present it in an impartial manner.
5. I do not recognize expediency as a justification for the relaxation of impartiality, objectivity, or the pursuit of exemplary technical competence.
6. The forensic science profession has a single ethical demand -- truthfulness; to this I commit myself totally and irrevokably.

It is to be hoped that the forensic scientist has embraced these covenants in any event and that they are not just for show, but the printed display will serve notice to everyone else that the scientist is not likely to be receptive toward efforts to encroach upon these principles.

When faced with any ethical dilemma, the forensic scientist should seek the counsel of other professional colleagues, or should seek the aid of a professional organization which has established ethical guidelines.

* From draft of chap. 5 "The ethics of the profession" of a book on Forensic Science - in preparation by John Thornton (1998). Please do not publish this until John Brot is published - but I know he would be pleased if you would adopt this as a statement of your personal philosophy - John Murdock, 3/4/99.


Case 1:10-cr-02734-JCH Document 418 Filed 04/22/12 Page 1 of 141

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW MEXICO

THE UNITED STATES OF AMERICA,
Plaintiff,
vs.
JOHN CHARLES McCLUSKEY,
Defendant.

No. CR 10-2734 JCH

MOTION TO EXCLUDE FIREARM IDENTIFICATION EVIDENCE, AND REQUEST FOR DAUBERT HEARING

COMES NOW, Defendant John Charles McCluskey, by and through his counsel of record, Michael Burt and Theresa Duncan, and pursuant to Federal Rules of Evidence Rules 104(a), 402, 403, 702, 703, Federal Rule of Criminal Procedure Rule 16 and the Fifth, Sixth, and Eighth Amendments to the United States Constitution, and respectfully submits this Motion to Exclude Firearm Identification Evidence And Request For *Daubert* Hearing.

The grounds for this motion are: (1) there is no reliable scientific basis for this proposed testimony, and thus the testimony is inadmissible under *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993) and *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 119 S.Ct. 1167, 143 L.Ed.2d 238 (1999); (2) the testimony is inadmissible under the 2000 amendments to Rule 702 in that (a) the testimony is not based upon sufficient facts or data, (b) the testimony is not the product of reliable principles and methods, and (c) the firearms examiner who performed the bullet comparison in this case has not applied the principles and methods reliably to the facts of the case; (3) the subjective conclusion, unsupported by statistical analysis,

(middle) Cover page of Defense Motion to "Exclude Firearm Identification Evidence and Request for Daubert Hearing"- McCluskey Case - 2012

(bottom far left) The author adopts, in 1999, as a personal standard, the "Six Statements of Ethical Behavior" proposed by John Thornton in 1998

Statement of Ethical Behavior

1. **As a practicing forensic scientist, I pledge to apply the principles of science and logic and to follow the truth courageously wherever it may lead.**
2. **As a practicing forensic scientist, I acknowledge that the scientific spirit must be inquiring, progressive, logical and unbiased.**
3. **I will never knowingly allow a false impression to be planted in the minds of anyone availing themselves of my services.**
4. **As a practicing forensic scientist, it is not my purpose to present only that evidence which supports the view of one side. I have a moral responsibility to ensure that everyone concerned understands the evidence as it exists and to present it in an impartial manner.**
5. **I do not recognize expediency as a justification for the relaxation of impartiality, objectivity, or the pursuit of exemplary technical competence.**
6. **The forensic science profession has a single ethical demand -- truthfulness; to this I commit myself totally and irrevocably.**

John E. Murdock
Firearms/Tool Mark Examiner

Abstract from John Murdock Draft 7-1-12

The Development by Empirical Testing of Numerical Criteria for the Identification of Striated Toolmarks

By Al Biasotti and John Murdock

The conclusions drawn from this training and research were published in 1997 in a chapter entitled "Firearms and Toolmark Identification" by Biasotti and Murdock which appeared in the two volume set "Modern Scientific Evidence – The Law and Science of Expert Testimony". The author's conservative quantitative criteria for identification are:

1. In three dimensional toolmarks when at least two different groups of at least three consecutive matching striae appear in the same relative position, or one group of six consecutive matching striae are in agreement in an evidence toolmark compared to a test toolmark.
2. In two dimensional toolmarks when at least two groups of at least five consecutive matching striae appear in the same relative position, or one group of eight consecutive matching striae are in agreement in an evidence toolmark compared to a test toolmark. For either of these criteria to apply, however, the possibility of subclass characteristics must be ruled out.

These same conclusions appear, unchanged, in Chapter 35, now authored by Biasotti, Murdock and Moran, in the now five volume set of Modern Scientific Evidence (MSE) published 2009-2010.

The research that led up to what co-authors Biasotti and Murdock called "conservative quantitative criteria for the identification of striated toolmarks (QCMS) was described only in a general way in the 1997 MSE chapter. The purpose of this paper is to describe more specifically the training and research that led up to the formation of the QCMS criteria. Regrettably, this should have been done before publishing the conclusions, but the opportunity to help prepare the American Jurisprudence to shoulder their gatekeeping role under Daubert, by co-authoring the chapter in MSE, was one that Biasotti and Murdock could not pass up.

(bottom) Biasotti and Murdock's "Conservative Quantitative Criteria for the Identification of Striated Toolmarks" - first published in 1997

However, the reality is that today most crime scenes are not processed by criminalists, but by Crime Scene Investigators (CSI's). Assuming that crime scenes are processed by **properly trained** CSI's, criminalists can still do meaningful crime reconstruction by evaluating their work product. If you can, provide training to CSI's from your client agencies. Once your laboratories have become proficient in crime reconstruction, let the local authorities know you can do this, so it can be requested proactively and not retroactively, as a last minute response to a reconstruction done by some other expert for opposing council.

5. Participate in research and write technical articles.

For most of the forensic science specialties, there are very few academic counterparts to produce the required scientific underpinnings. Practitioners must do it, while at the same time producing casework. The best forensic laboratories will allow some of this research to be done on lab time, especially if it can be associated with casework. But, some of it will usually have to be done on your own time. If you are able to team-up and work with colleagues on research, this makes it more bearable.

Once the research is done, it must be written for publication. This can also be a combined laboratory and personal time activity. Writing is not easy. In a recent article entitled "Seduced by Twitter" by Kathryn Schuly in *The Week* magazine, she describes writing in the following way:

I began this piece by noting that writing my book involved spending four years in a figurative cave. In my experience, that cave is the necessary setting for serious writing. Unfortunately, it is also a dreadful place: cold, dark, and desperately lonely.

Eighty percent of the battle of writing involves keeping yourself in that cave: waiting out the loneliness and opacity and emptiness and frustration and bad sentences and dead ends and despair until the damn thing resolves into words. That kind of patience, a steady turning away from everything but the mind and the topic at hand, can only be accomplished by cultivating the habit of attention, and a tolerance for solitude.

6. Prepare for 402/*Daubert* Admissibility Hearings

The *Daubert* decision was rendered in 1993. The five *Daubert* criteria are:

1) Can your theory, or whatever you are giving testimony about, be tested by direct empirical observation? (falsifiability)

2) Publication and peer review (especially in quality journals with good editorial review)

3) Error rate (false positive in particular)

4) Are there QC and QA guidelines?

5) Has it been accepted by the relevant scientific community? (holdover from 1923 *Frye* ruling)

The *Daubert* decision was a good one, and the criteria are relevant. Most States have either implicitly or explicitly adopted them. In some forensic laboratories, only one staff member is prepared to testify in such hearings. I believe that all staff members should be prepared to defend their respective specialties in these hearings because: 1) every expert witness should know the answers to each of these criteria and; 2) the preparation will give them a greater, in-depth, understanding of their subject matter and make them better witnesses. The learning curve can be steep, but the end result is worth the effort.

7. Join relevant professional associates and volunteer for committees

While there are many reasons to join professional associations, it is my belief that a Code of Ethics, with an Enforcement Procedure, is the main one. The CAC has, in my opinion, the best of both. The Code is comprehensive and the Enforcement Procedure allows: 1) the CAC to enforce its Ethic Code; and 2) those accused are afforded due process of law, which is essential. AFTE recognized the value of both of these documents, and adopted them.

While there are many reasons to join professional associations, it is my belief that a Code of Ethics, with an Enforcement Procedure, is the main one. The CAC has, in my opinion, the best of both.

Committees are the engines that drive professional associations. So, gauge your strengths, and volunteer for committee assignments. But, be sure and balance your professional association involvement with your personal life. One of my colleagues, Eric Collins, usually works a lot of overtime when it is available, and has also taken on a lot of very important committee responsibilities for AFTE. Because of this, he became the subject of this Dilbert comic strip. Don't let this happen to you!

8. Participate in editorial review.

Forensic science journals, especially specific ones like the *AFTE Journal* and the *CACNews*, are criticized generally for not having meaningful editorial review. Our critics say that since we pretty much all know each other, our editorial review is not critical enough to ensure that only sound scientific research finds its way into print. They compare us with non-forensic science journals where editorial review is reported to be much more severe, often done by scientists doing research in direct competition with that being done by other scientists whose technical articles they are reviewing. To a certain extent, I agree with this criticism. This underscores the importance of critical editorial review.

If you have the skill, and some people do not, I encourage you to volunteer to be an editor. To emphasize the importance of quality editing, my colleague, Eric Collins, in his capacity as an Assistant Editor of the *AFTE Journal*, recently revised the Manuscript Review Form intended for use by an author's colleagues, to include the admonition "The editors are counting on you being honest and forthright in your review. Your signature on this form attests that you performed your review in this manner."

Of the six AFTE Manuscript Evaluation elements, I consider the two most important ones to be:

1. Is this work significant and has sound scientific methodology been utilized?

2. If possible, how could the author add to the scientific value of the manuscript, and what further research or work could be done to expand on the information presented?

If you do not feel that you have the required skills in the conduct of inquiry to evaluate these two elements, as well as evaluating grammar and sentence structure, volunteer for other committee assignments, because without these skills, you would do more harm than good as an editor.

9. Learn and teach the ethics of forensic science by using ethical dilemmas.

To quote Contra Costa's very capable QA officer, Shana Meldrum, "It seems over the past five years there has been an explosion of crime lab scandals in the news."

Brent Turvey, in his 2013 book, "Forensic Fraud," says that major failures have occurred in more than 100 American crime labs.

An article entitled "Forget *CSI*: A Disaster is Happening in America's Crime Labs" by Jordan Smith appeared as recently as April 30, 2014 in *Business Insider*. It contains little new information, but compares recent well publicized crime lab transgressions with the way forensic science is portrayed on TV in shows like *NCIS*, *Bones*, *Dexter*, and many others. The author wishes that the country's real-life crime labs were half as effective as they are portrayed on TV. **How rude!**

Has all of forensic science lost its ethical compass? No, I don't think so, but you will have to admit that the scandalous transgressions of a few make us all look bad.

In 1998, I gave an address at the CAC meeting here in San Diego entitled "Ethics is not a dirty word." My message then, and now, is that crime labs can create a culture of ethical conduct by engaging in training based on the evaluation of ethical dilemmas. I recommend that your laboratory quality assurance officer distribute, on a regular basis, ethical dilemmas, and require staff to evaluate them against a code or codes of ethics. When I was lab director, I used a series of ethical dilemmas in this way. They were written by Pete Barnett and Parker Bell. Carolyn Gannett has been doing a good job lately of writing a column for the *CACNews* using ethical dilemmas. Requiring ethics codes to be used in this "comparative way" requires staff to study them to see how they may be applied in various circumstances.

There is something else that I think would help create a culture of ethical conduct in the CAC. This is the publication, in the *CACNews*, of summaries of CAC Ethics Hearings. These hearings are often sparsely attended by members. These summaries, including the reasoning used to render decisions, would help create a common-law type of knowledge among members. This knowledge could help members reach proper decisions when ethical dilemmas are encountered in real-life. You can find a summary like this that I wrote, as CAC President, in the January 1986 issue of the *CACNews*.

If a crime lab does not have their own ethics code, they can adopt a Professional Association code and make it part of their own polices. In this way, you can require adherence by staff who do not join any forensic organizations. You can enforce these "adopted" ethics codes because transgressions can be viewed as conduct tending to bring the reputation of your parent organization into disrepute. Joe Peterson and I described this 'adoption" procedure in a *Journal of Forensic Science* article we wrote in 1989.

Something else that might help reduce the "explosion of transgressions" is to encourage the adoption of a personal "Statement of Ethical Behavior." Such a statement was proposed, for the forensic scientist, by John Thornton for a book he was writing in 1998. He did not finish his book, but he modified his "statement" and tailored it for Crime Reconstructionists. It can be found in John's chapter on "Ethos and Ethics" in Chisum and Turvey's book—"Crime Reconstruction".

In 1999, I printed a copy of Johns original 1998 "Statement", signed it, and displayed it prominently in my work area. It is still on display there. I think every forensic scientist should do the same. If I were to be a lab director again, I would display John's General Statement in the lobby.

I would like to conclude my lecture this morning by describing my personal philosophy of "Conservation of Emotional Energy." Each of us only has a finite amount of it at any given time. To help me conserve mine, I try my best to live by the following motto, written in 1894:

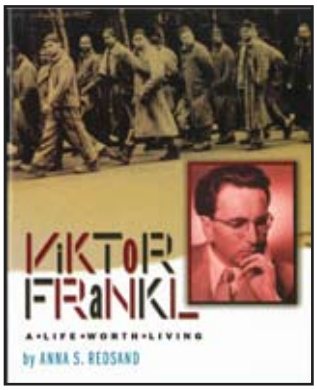
"One day at a time—this is enough. Do not look back and grieve over the past, for it is gone: and do not be troubled about the future, for it has not yet come. Live in the present, and make it so beautiful that it will be worth remembering."

Although I do not expect things to go wrong, I try to anticipate how they could, and, therefore, when they do, I am not surprised. This makes it easier for me to conserve emotional energy and react calmly, and say, okay, now what do we do. I deliberately do not let my blood boil by reacting badly. Reacting badly burns up valuable emotional energy, and has a very negative effect on both you and those around you, which is not fair.

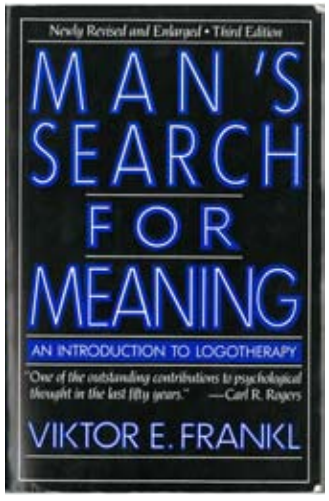
As I said when I began, each of us has choices. This morning I have described some that I have made. The importance of choices was made clear to me years ago by Viktor Frankl. He was a prominent psychiatrist in Vienna, when, in September 1942, he and his family were arrested and sent to a Nazi concentration camp. By the time the camp was liberated 3 years later, most of his family had been killed, including his pregnant wife. He survived, and in 1946 wrote 'Man's Search for Meaning." In 1990, the Library of Congress and the Book-of-the-Month-Club listed this book as one of the ten most influential books in the United States. In this book, which I highly recommend, he concluded that finding "**meaning** in life", **not happiness**, made many prisoners far more resilient to suffering than prisoners who had lost hope. Frankl concluded that "*everything* can be taken from a man but one thing, the last of the human freedoms—*the ability to choose one's attitude in any given set of circumstances, to choose one's own way.*" Therefore, no matter what happens to us, no matter how we are treated, **we can choose how we react to it. No one can take away our ability to make this choice!**

In closing, I sincerely hope that each of you finds meaning in your own life, both personal and professional, and that you get as much pleasure as I do, in deliberately exercising control over your own choices.

Mr. Chairman.



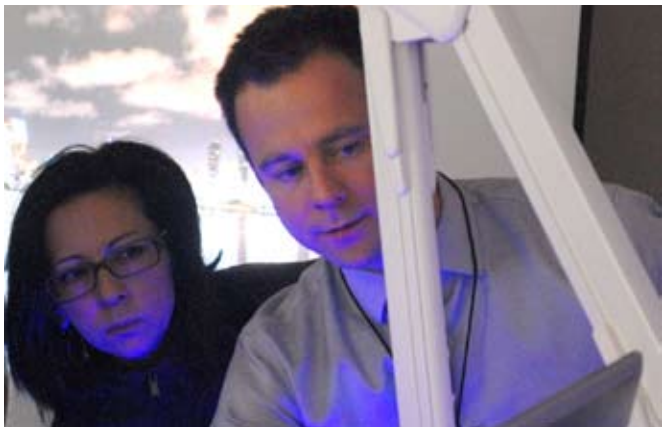
"Viktor Frankl - A Life Worth Living"- by Anna S. Redsand , 2006



"Man's Search for Meaning" by Viktor Frankl – 1946

Spring '14 in San Diego

The UV-Vis & IR workshop provided hands-on opportunities with new crime scene searching equipment. (r) Instructor Owen Lang demonstrates the latest gear from Foster-Freeman.



Spring in San Diego

(left) NWAFS President Kathy Kittell attends. The Northwest Assoc. will be joining the CAC at the fall seminar in Rohnert park. (above, l-r) John Murdock, CAC President Elect Chris Coleman and Robert Thompson. (right) Mike Grubb (l) prepares his opening remarks with assistance from incoming CAC President Greg Laskowski.

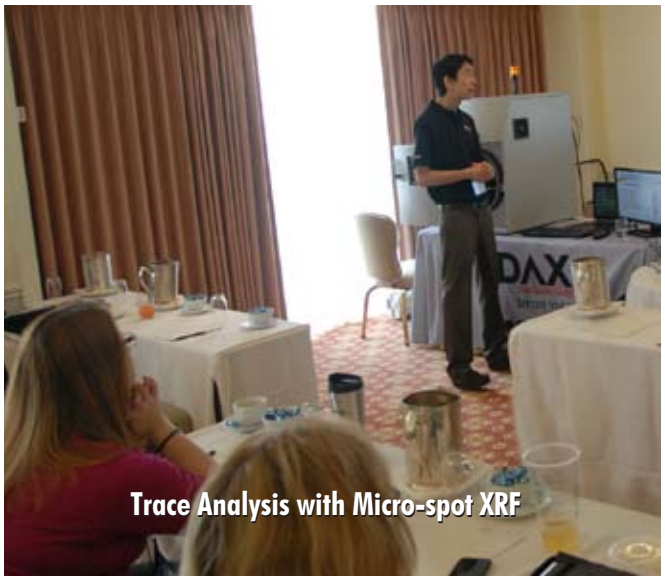
2013-14 CAC Board of Directors
(clockwise from left) Eric Halsing, President, Alice Hilker, Reg. Dir. North, Mey Tann, Reg. Dir. South, Kirsten Fraser, Recording Sect'y, Greg Laskowski, President Elect, Greg Matheson, Editorial Sect'y, Meghan Mannion-Gray, Treasurer, Todd Weller, Immed. Past President, Michelle Halsing, Membership Sect'y.

2014-15 CAC Board of Directors
(l-r) Michelle Halsing, Membership Sect'y. Eric Halsing, Immed. Past President, Greg Laskowski, President, Meghan Mannion-Gray, Treasurer, Alice Hilker, Reg. Dir. North, Mey Tann, Reg. Dir. South, Kirsten Fraser, Recording Sect'y, Chris Coleman, President Elect. Not shown, Greg Matheson, Editorial Sect'y.


Emerging Drug Trends

DNA


FTIR for Drugs


Trace Analysis with Micro-spot XRF


Particle Combination Analysis


Forensic Pathology Concepts

Connie Milton and the San Diego Sheriff's Lab went all out to provide attendees with a spectrum of interesting workshops, speakers and entertainment. Only a block away from the Gas lamp Quarter, the Westgate hotel provided a gorgeous backdrop for the Spring 2014 seminar which was highlighted by a trip to Petco Park to see the Padres play.

The workshops available to attendees included: DNA (various presenters); Trace Analysis with Micro-spot XRF (presented by EDAX); FTIR for Drugs (presented by Perkin Elmer); UV, Vis & IR Crime Lites (presented by Foster-Freeman); Particle Combination Analysis (Presented by David Stoney); Emerging Drug Trends (presented by DEA Southwest Lab Staff); Forensic Pathology Concepts (presented by San Diego County Medical Examiner Staff).

Spring in San Diego

We Appreciate Our Vendors





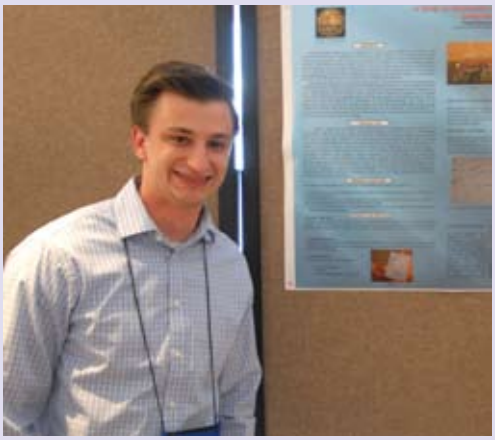


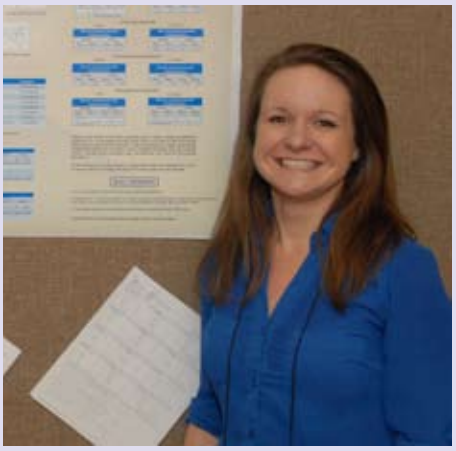

Spring in San Diego

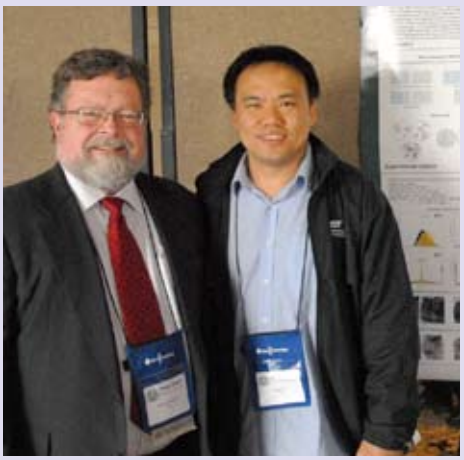
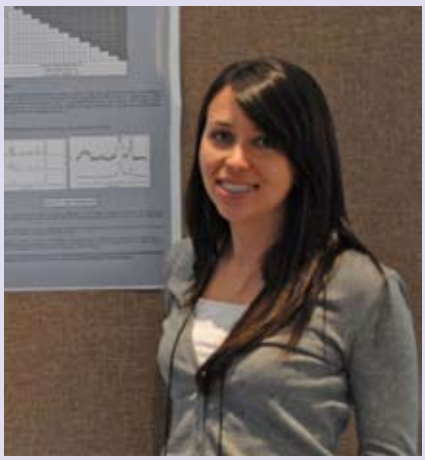
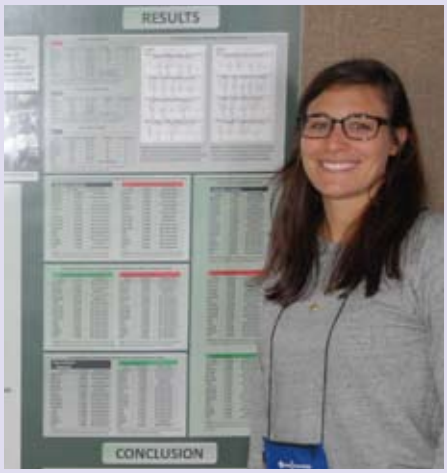
Raymond Davis signs copies of his second novel, "Parabellum."

NYTimes bestselling author Caitlin Rother personalizes your copies.





Presenters: *(top row, l-r)* Lino Garcia, Elisa Martinez, Chad Eyerly, *(2nd row, l-r)* Shane Williams, Katie Caswell, Nancy Kedzierski, *(3rd row, l-r)* Vanessa Meneses, Wei Chu (*r, posing with Robert Thompson*), Chelsea Johnson, *(bottom, l-r)* Rachel Gordon, Stephanie Gipson.

See the poster abstracts in this issue and read more about these projects.

Outgoing CAC President Eric Halsing presents Greg Laskowski with the symbols of office, the gavel the traditional coconut and medallion.

Founders lecturer John Murdock receives a plaque from John Dehaan.

The Biasotti Most Outstanding Presentation award for the Fall 2013 seminar was given to Meghan Mannion Gray from the Jan Bashinski DNA Lab. Her paper was titled, "Mendocino County Murder Solved After 25 Years."

CAC Life Memberships were awarded to Raymond Davis and John DeHaan for many years of commitment to criminalistics and the CAC.

The Ed Rhodes III Memorial award was given to Scott Becker from the Orange County Crime Lab.

A CAC Service Award was given to Connie Milton for her tireless efforts as the chair of this excellent seminar.

CAC Service Awards were also given to Dean Gialamas, Dave Stockwell, Alicia Lomas-Gross, Frances Sperow, Felicia Burke, and Barbara Burritt for their work on various CAC committees.

For their service as chairpersons of study groups, Service Awards were also given to Lynn Herold & Ron Nichols.

Annette McCall from the Orange County lab was the lucky winner of the Full Member Seminar Lottery. She couldn't attend, but she passed it onto another full member of her choice in keeping with the lottery rules.

Abstracts
From the
Spring 2014
CAC Seminar
San Diego

Evaluation of Case History of Synthetic Cannabinoids Detected in Eleven Cases in Orange County, CA as Screened by Immunalysis® K2 (Synthetic Cannabinoids-1) Direct ELISA Kit

Dani Mata, Orange County Crime Lab

In March 2011, the United States Drug Enforcement Agency banned five synthetic cannabinoids: JWH-018, JWH-073, JWH-200, CP47,497 (C7), and CP47,497 (C8). Many more have been banned since that time either on a federal or state-by-state level. Drug manufacturers and distributors are constantly updating the contents of the herbal blends in order to stay ahead of local and federal legislation. Toxicological screening for an ever changing list of synthetic cannabinoids continues to present a challenge to forensic laboratories as they try to keep up with what is currently on the streets. The Orange County Crime Lab screened over 1300 antemortem and post-mortem cases, from 2011 and 2012, using Immunalysis® K2 (Synthetic Cannabinoids-1) Direct ELISA Kit to determine if there is a need to include synthetic cannabinoids in routine screening. There were 9 positive cases and 2 cases just below the limit of detection that were sent to NMS labs for confirmation. Once confirmation of the presence of synthetic cannabinoids was obtained, the police or coroner's reports were gathered. The symptomology or the cause of death for all individuals found to have synthetic cannabinoids in their blood will be discussed in this presentation. If field sobriety tests were performed for the antemortem cases, those results will also be shared.

Top-Shelf or Any Shelf: A Blood Alcohol Storage Study

Chelsea Carter and Raegan Carter, San Diego Sheriff's Department Crime Lab

The San Diego Sheriff's Regional Crime Laboratory Forensic Alcohol section receives 12,000 blood samples a year for alcohol and/or toxicology testing. This presentation will examine storage conditions of blood samples as well as the time between collection and analysis in hopes of addressing some common defense challenges. They will discuss issues of fermentation, 'CSI sampling', varied storage conditions, as well as taking a look at long term storage of samples and the effect on ethanol concentration.

Raman Spectroscopy: A New Analytical Tool at the SDPD Crime Laboratory

Lisa Merzwski, San Diego Police Department Crime Lab

Raman spectroscopy can provide rapid, non-destructive analysis of a variety of drug types. This instrument is an independent analytical technique for chemical identification as supported by the Scientific Working Group for the Analysis of Seized Drugs (SWGDRUG), analogous to GC/MS and FT-infrared spectroscopy instrumentation. The San Diego Police Department Crime Laboratory recently purchased and validated a Raman instrument for the analysis of controlled substances – the DXR SmartRaman Spectrometer manufactured by Thermo Scientific.

A unique feature of the DXR SmartRaman spectrometer is that it is suitable for analyzing solids and liquids in a variety of packaging and container types. This allows an analyst to simply place the packaged drug onto the platform of the instrument without having to break the evidence seal. Providing the sample gives a strong vibrational spectrum, the container type is of little importance. Unlike infrared spectroscopy, Raman is useful in the analysis of mixtures. This is significant, as street drug samples can have many compounds present other than the drug of abuse. Cocaine samples that are not typically suitable for infrared spectroscopy analysis in the SDPD laboratory due to the addition of inositol can be analyzed using the Raman spectroscopy subtraction feature. This presentation will cover briefly how the Raman spectroscopy instrument works, the types of packaging that can be used to house controlled substances, and how mixtures can be analyzed by the instrument.

Analyzing & Comparing Large Format Impression Evidence Recordings on Screen in Real Time

Greg Laskowski, Criminalistics Services International, LLC

Standard methods for evaluating and comparing impression evidence case samples such as footwear and tire track imprints and impressions generally require hard copy photographs and control inked imprints either on opaque material or transparent media. Using the Mideo Systems CASEWORKSeis (CWS) system, images can be entered and recorded into the system digitally. These digital images whether they be photographs, imprints on opaque media or transparencies can be stored and adjusted for size so long as a proper scale is present. Large format digital images (raw, bitmap, jpeg, etc.) can be sized, enhanced, and compared either in side by side mode on a single screen or multiple screen or as transparencies. The degree of transparency of the control imprint or the question imprint/impression can be adjusted, rotated and enhanced for contrast and size on the fly. Each step of image adjustment is recorded and stored as a metadata file to ensure security and record and photo manipulation. Images can be marked up using a variety of markup tools. Images can be printed in any size or retained for onscreen viewing.

The system is compatible with most Laboratory Information Management Systems (LIMS) and meets the ever evolving standards for ISO, ASCLD/LAB, SWIGIT, and SWGFAST. The examiner has total control of how to prepare, evaluate and compare evidence to evidence and evidence to knowns. All this can be done in real time thus saving photo developing costs, printing costs and most important the examiner's time. Demonstration of the Mideo Systems CASEWORKSeis CWS system using real images will be presented.

Obtaining DNA from Unfired Firearms Cartridges and Fired Cartridge Casings

Shawn Montpetit, San Diego Police Department Crime Lab

Shooting incidents often yield cartridge casings as potential evidence items. Historically, cartridge casing evidence has been used to link firearms with particular crimes, or separate crimes to a single firearm. The success of "touch DNA" analysis has prompted questions of using DNA on the surfaces of cartridge casings to identify potential shooters. This short presentation will include a discussion of the success rates from an in-house research project and recent casework. The presentation will also serve to provide points of consideration and context for other agencies that are considering conducting DNA analysis on this type of evidence.

Practical Applications of Forensics - A Case Study: *People v. Samuel McCauley and Franko Bernal*

Janet Ryzdynski, San Diego Sheriff's Department & James Romo, San Diego DA's Office

On November 24, 2006, Daunte Mercado-Bates was murdered in Murrieta, CA (Riverside County). On November 25, 2006, Pedro Hernandez Vargas was murdered and Andre Villaverde was shot and seriously wounded, in a 7-11 in Lemon Grove. Forensic science proved the same weapon was used to commit the crimes and that Samuel McCauley and Franko Bernal were the perpetrators.

Overview of the Orange County District Attorney DNA Database Program

Jody Hynds & Scott Scoville, Orange County District Attorney's Office

In 2007, OCDA's Office received approval from the OC Board of Supervisors to start a local DNA Database separate from the OC Crime Lab's LDIS. Since commencement, the OCDA DNA Database has collected over 105,000 samples from individuals who have pending criminal matters. Additionally, over 50,000 state/CODIS samples have been submitted to CalDOJ as part of OCDA DNA program. This presentation will provide an overview of the implemented policies and procedures from sample collection to notification. Additionally, the presentation will discuss how the OCDA DNA Database anticipates the use of data from the Rapid DNA instrument to provide real-time investigative leads to law enforcement.

The John Gardner Investigation: Remembering Chelsea King and Amber Dubois

Scott Enyeart & Mark Palmer, San Diego Sheriff's Department Homicide

Chelsea King was an Honor Student and on the Cross Country Running Team at Poway High School. On the morning of 02/25/2010, her father heard her leave for school. When Chelsea did not return home or answer her phone by 1800 hours, her parents began to worry. They reached out to her friends, but no one knew where she was. In an effort to locate her, her father had their cell phone subscriber "ping" Chelsea's cell phone. They learned her phone was at the Rancho Bernardo Community Park in the City of San Diego. When her father checked the location, he found her car in the parking lot. Due to the unusual circumstances the King's called the San Diego County Sheriff's Department to report her as missing. The report prompted a massive response by the Sheriff's Search and Rescue Team, with assistance from several search and rescue teams from surrounding counties, as well as the FBI, the National Center for Missing and Exploited Children and other federal, state and local law enforcement agencies. Chelsea King was ultimately discovered to have been abducted, raped, and murdered by a registered sex offender and sexual predator identified as John Gardener.

On February 13, 2009, the parents of Amber Dubois reported her as missing from their Escondido, CA home. Fourteen year old Amber was last seen at 0630 hours as she was preparing to leave her home to walk to Escondido High School where she was in the 9th grade. Amber never showed up at school and did not return home at her normal time. Amber had a cell phone, but never called her parents and did not answer calls made by her parents. Prior to the day Amber went missing there had been no problems or arguments between her and her parents and no law enforcement contacts. Amber's parents did not believe she was a runaway. Over the next thirteen months Escondido Police Department investigators conducted an exhaustive search for Amber with negative results.

On 03/05/2010, San Diego County Sheriff's Department Homicide Investigators received information that John Gardner, a registered sex offender who was in custody for the rape and murder of Chelsea King, wanted to lead investigators to Amber Dubois's burial site. Gardner confessed to Dubois' kidnap and murder. Gardner led detectives to a remote site off of Arouba Road near Pala Road where human skeletal remains were ultimately located. The remains were confirmed as those of Amber Dubois by the San Diego County Medical Examiner's Office.

Ethics and Professional Practice: What Does the Future Hold?

Peter Barnett, Forensic Analytical Sciences, Inc.

As a consequence as of the NAS Report, the NIST Organization of Scientific Area Committees (OSAC), the recently introduced Federal legislation, the *Criminal Justice and Forensic Science Reform Act* (S. 2177), and the DOJ/NIST Memorandum of Understanding significant, maybe even monumental, changes in the operation of forensic laboratories is occurring and will continue to evolve under the auspices of the NIST oversight process. Part of these changes will be in the area of ethics and standards of practice for forensic scientists. In addition to all of the above there are many institutional players who have a stake in any developments: Forensic accreditation and certification bodies (ASCLD&ASCLD-Lab, FQS, ABC, etc.), professional organizations (AAFS, CAC, et al.), individual agencies which operate forensic laboratories, and individual practitioners (employees of law enforcement labs, private labs, individual practitioners, academics, etc.). Most of these groups have in place Codes of Ethics or Standards of Professional Practice. The NIST Quality Infrastructure Committee "composed of up to 10 standards experts, quality systems managers, and accreditation and certification specialists" is charged with development of a "Forensic Science Code of Practice." What will this document be? Is it something like a SWGs document published as a ASTM? Is it more like the ISO Standards, or more like the Code of Ethics of the CAC? What will be the consequences of national "Forensic Science Code of Practice?"

Unleashing Next Generation Forensic Trace Evidence Analysis: Inferences and Quantitative Associations from Particle Combinations

David Stoney, Stoney Forensic, Inc., Chantilly, VA

Fine dust particles are found adhering to virtually any object and within virtually any product. These very small particles (VSP) are the result of the object's unique history of exposure. Application of high-throughput individual particle analysis, together with increasingly sophisticated data analysis, allows the exploitation of these complex particle sets.

Two examples of the use of VSP for associations are (1) utilization of the VSP "riding piggy-back" on the surfaces of carpet fibers as a form of multiple-transfer evidence, and (2) the use of searchable VSP particle profiles to identify links between different crimes, events and people. There are also important inferential investigative applications of Particle Combination Analysis that efficiently exploit the available specimen to address case-specific questions.

This project was supported by Awards No. 2010-DN-BX-K244 and 2012-DN-BX-K041 awarded by the National Institute of Justice, Office of Justice Programs, U.S. Department of Justice. The opinions, findings, and conclusions or recommendations expressed in this presentation are those of the authors and do not necessarily reflect those of the Department of Justice.

Alternative method for glasses identification: PCA base compositional profiling by micro-XRF

Sergey Mamedov, Horiba Scientific, Edison, NJ

X-Ray Fluorescence (XRF) spectroscopy is useful tool for identification substances and confirming their identity with little or no sample preparation. New capabilities of the energy dispersive XRF analytical microscope (micro-XRF) enable the recording not only spectra of small glass particles (as small as 50-100 microns) but also hyper-spectral image of any object with high spatial resolution. The data can be mined for unsuspected elements after the measurements have been made, and statistical method (multivariate analysis) can produce chemical distributions of the elements and/or material classification based on Principal Component Analysis, in particular, with association between elements that can aid in identification of bonded phases. For example, statistical analysis of micro-XRF data for glasses can be used to locate the make, model, and year of car by analyzing a glass chip. This presentation will provide practical insights into the application of the micro-XRF to the analysis of glasses and soil.

We collected and analyzed spectra of the glass from several cars manufactures and commercial glasses (microscope slides, window glasses, fuse glass) in the range of 1.00-40.96 keV (<400 spectra). Because the only few spectra have an additional features in the energy range above 15 keV, spectra were truncated and analysis was done in spectral range of 1.00—15 keV. Standard FPM algorithm without any correction and/or calibration was used to calculate concentration of Na2O, MgO, Al_2O_3, SiO_2, K_2O, CaO, TiO_2, MnO_2, Fe_2O_3, As_2O_5, CeO_2 in all samples. We used this set of concentration to build a data set for PCA. All spectra and concentration data sets were scaled before Principal Component Analysis was applied. We will show correlation between classification based on spectral analysis and concentration analysis.

Hair Chalk - A New Type of Trace Evidence

Bob Blackledge

Hair chalk is the latest fad among teenagers and young women. It's easy to apply; is nonpermanent, and easily washes off. It typically lasts three days or less. It will last longer if after application you spray the hair with hair spray. Should a sexual assault or abduction victim be using hair chalk as a part of her makeup, in the course of the struggle it is likely traces of hair chalk and/or individual chalk-bearing hairs will be exchanged between victim/assailant/crime scene. But except for color, isn't it all pretty much alike? No! This presentation will show how greatly the composition of different brands vary and how the surface analysis method, x-ray photoelectron spectroscopy (XPS), can detect and characterize hair chalk traces on individual hairs or on transfers to clothing items.

Wayne Moorehead – Los Angeles Sheriff's Department Crime Lab

Stability of Select Refractive Index Liquids-Part 1: Cargille Labs Series A and AA

Cargille refractive index liquids are used for characterization and identification of unknown materials and trace evidence. Due to the expense of refractive index liquids for most Trace sections of the forensic laboratory, the liquids are typically not replaced on a regular basis.

Because the liquids are used for elimination as well as identification of unknown substances, the analyst should have an understanding of how stable the stored liquids are in the normal laboratory environment. In this part of the study, two full sets (30 liquids each), one half set (15 liquids), and select extra bottles from Series AA and seven full sets (91 liquids each) and one half set (46 liquids)of Series A were evaluated. Based on the lot numbers, the age of the liquids was up to 31 years for Series AA and 33 years for Series A. Both sets retained reasonable stability over that time span. If the value of a refractive index liquid is a critical measurement, then the liquid should be checked with a refractometer.

Automating the Differential Digestion Process in the Analysis of Sexual Assault Evidence using Selective Degradation

Helena Wong - Oakland Police Department Crime Lab

An automated differential digestion protocol was developed using selective degradation. The current differential digestion process requires multiple wash and centrifugation steps to remove residual epithelial DNA from the sperm fraction. The selective degradation technique replaces these labor intensive steps by using a degradative agent, DNase I, to digest the remaining epithelial DNA. The use of DNase on evidence samples and its effect on DNA yield and DNA typing quality was assessed. Studies were performed on semen stains stored for an extended period of time (up to 60 years) and on semen samples subjected to heat, humidity and multiple freeze/thaw cycles to evaluate the effects of DNase on environmentally compromised sperm samples. The automated protocol utilized 96-well plates for high efficiency and incorporated microscope slide preparations for the confirmation of the presence of sperm. Through the use of the selective degradation method, automation of the differential digestion process was achieved without having to compromise on the quantity and quality of the DNA obtained.

Reflections: 25 Years of Teaching the Courtroom Testimony Class

Raymond Davis - Courtskills

This presentation will cover five main topics. First, the genesis of the courtroom training course which began in 1972, the development of the course material from 1972 to 1989, extraordinary classroom events over the past 25 years, copywriting of the course material and last, recognition of the individuals who have made the course a great success. The Courtroom Presentation of Evidence course was first presented at the California Criminalistics Institute in the Spring of 1991 through the efforts of Louis Maucieri, then program manager at CCI. It was his desire to offer a course on courtroom testimony which provided the spark for launching Raymond's course which continues to provide timely training to forensic experts across the United States.

The Courtroom Presentation of Evidence course is a POST certified course and Raymond Davis is a POST certified instructor. The Courtroom presentation of Evidence course is the highest rated course ever conducted at CCI. Through 200 classes, Raymond has trained over six thousand forensic scientists, CSI experts, SART nurses and police officers the skills to survive and thrive in the courtroom. This course has been presented to members of the FBI, ATF, Customs & Border Protection Labs, to numerous forensic science associations: NWAFS, SWAFS, CAC, NEAFS, SAFS, SWAFDE, IAI and AAFS. As well as numerous city, county and state crime labs in seventeen states.

The Murder Book: How to Turn Crimes into Narrative Non-fiction

Caitlin Rother, New York Times Bestselling Author

New York Times bestselling author Caitlin Rother has written or co-authored nine books for HarperCollins, Simon & Schuster, Wiley and Kensington/Pinnacle, including POISONED LOVE, LOST GIRLS, and her latest, I'LL TAKE CARE OF YOU. Rother will talk about how she conducts in-depth research and uses fiction techniques to write true stories about murder, criminal investigations, the justice system, and the psychology behind the stories. As a writing instructor, book doctor, and coach/consultant, she will also discuss how she helps others do research, conduct interviews, shape and write their stories, and get publishing contracts.

Furensics: Every Dog Has Its Day - In Court

Christina Lindquist, UC Davis, Veterinary Genetics Laboratory, Forensic Unit

As the only crime laboratory in the world ASCLD/LAB accredited for analysis of DNA from domestic animals, the Veterinary Genetics Laboratory Forensic Unit at the UC Davis School of Veterinary Medicine serves federal, state, and local law enforcement agencies as well as the general public. The majority of our cases are from the U.S. and Canada with occasional cases arriving from Great Britain, South America, Australia and Japan as investigators reach out for assistance on hard-to-solve cases.

While VGL-Forensics has databases available for dogs, cats, horses, cattle, sheep, goats, pigs, deer, elk, wolves, coyotes, bear, llamas and alpacas, the majority of our casework is canine. A thorough look at the DogFiler and Mini-DogFiler panels developed at VGL-Forensics will be presented. These panels were published in 2012 and have been utilized to establish our database of over 2000 dogs, wolves and coyotes. A combination of the DogFiler panel and the ISAG dog markers (a total of 38 markers) has been integral in the development of our wolf- and coyote-hybrid tests.

Case examples from Southern California and the international community will also be presented.

NIST Organization of Scientific Area Committees (OSAC): Input Received and Proposed Plan Development

Robert M. Thompson – National Inst. of Standards & Technology

The development of a quality infrastructure for forensic science was a key component of some of the reforms anticipated in the National Academy of Sciences (NAS) report. In response to the report, the National Institute of Standards and Technology (NIST) and the US Department of Justice signed a bilateral agency Memorandum of Understanding (MOU) in March 2013 which specified the establishment of "Guidance Groups" now termed Scientific Area Committees (SACs).

NIST created the Organization of Scientific Area Committees (OSAC) model to promulgate NIST's responsibility to administer and coordinate support for the discipline-specific SACs. In September 2013, NIST issued in the Federal Register a Notice of Inquiry (NOI) to obtain national and international input on the establishment and structure of governance models. Eighty-two submissions were received in response to the NOI. NIST envisions uniform administration of development, promulgation and adoption of standards through the OSAC as well as supporting communication flow between the SACs and the forensic science community. The plan design intends to bring structure, scientific rigor and increased communication among forensic scientists, research scientists, academicians, statisticians, attorneys, managers and quality assurance specialists.

Stranger/Acquaintance Rape: A DNA Case Presentation

Adam Dutra - San Diego Police Department Crime Lab

This presentation highlights a sexual assault that occurred in San Diego. The scenario, DNA results, and statistical approaches will be detailed. The strength of the DNA evidence was improved following consultation with the detective.

Getting Results in Non-Traditional DNA Cases— Uriah Courtney Case Example

Alissa Bjerkhoel & Alexander Simpson, Calif. Innocence Project

The exonerations of hundreds of American citizens have proven eyewitness identifications are far from perfect. Of our nation's documented DNA exonerations, 71% involved misidentification. The case of Uriah Courtney is a classic misidentification case where DNA proved his innocence of a sexual assault. In 2004, a man attacked Erika as she walked to a friend's house in Lemon Grove. He grabbed her, threw her down to the ground, ripped her underwear, and digitally penetrated her. Erika fought vigorously with her attacker and broke free, escaping into a passing car. She later identified Uriah from a six-pick lineup as her attacker. In 2005, the San Diego Sheriff's Department performed DNA testing, but did not obtain any meaningful results. Uriah was subsequently convicted and sentenced to life in prison. Subsequent DNA testing by

Bode Technologies in 2012 revealed a full STR male profile on the victim's shirt from which Uriah was excluded, a location where the San Diego Sheriff's Department refused to test. The profile was run through CODIS by the Orange County Crime Lab and a match was obtained to a local man with a history of sexual assaults. That man lived near the crime scene and had a striking resemblance to Uriah. Based on this evidence, Uriah's conviction was reversed and he was freed.

The Cat's Meow: The Story of Hannah Anderson

Christi Licudine & Glenn Giannantonio, San Diego Sheriff's Department Homicide

James DiMaggio was a close family friend of Brett and Christina Anderson, considered an uncle to their two children – 16 year old Hannah and 8 year old Ethan. The Anderson's divorced in 2012 and Brett moved to Tennessee, but DiMaggio remained in contact with the remaining family in San Diego County. In late July 2013, DiMaggio invited Christina, Hannah, and Ethan over for a get together, as he claimed that his home was in foreclosure and he would soon be moving. They made plans to spend the later part of Saturday, August 3rd at his home. Sometime after noon, Christina, Ethan, and the family dog arrived at the DiMaggio property. James went to pick up Hannah from cheerleading practice later that day. Returning to the property, he told Hannah that her mother and brother were visiting neighbors. Hannah was then held against her will.

Sometime after midnight DiMaggio forced Hannah into his vehicle and departed the house, where a fire was later reported by a neighbor on Sunday, August 4th. The body of Christina Anderson was found in a detached garage and An AMBER alert was broadcast throughout California for Hannah and Ethan Anderson. Sheriff's homicide was called to the scene when Christina's body was found in the garage area. During the homicide investigation, the Anderson's deceased dog and Ethan's charred remains were located. Ethan's remains had not been positively identified at this time.

News outlets from the surrounding states broadcast the AMBER alert information on the local news stations. A tip from Idaho alerted law enforcement to search the heavily wooded area in Cascade. DiMaggio's vehicle was located underneath brush in the forest. On Saturday, August 10, 2013 DiMaggio and Hannah were sighted by a surveillance aircraft, camping near a lake in the Cascade area. At about 1721 hours, FBI Hostage Rescue Team members confronted DiMaggio. DiMaggio fired two rounds from a long rifle in the direction of the agents. DiMaggio was shot and killed by the agents. Hannah was rescued and returned to her father in San Diego.

Lost but Found: Melding Forensic Science Education with Real Case Experience

Dana Kollman, Towson University, Towson, Maryland

Towson University's Forensic Science Student Organization has created partnerships with several law enforcement agencies and has assisted them in the search for human remains when police recruit classes are unavailable or cases have gone cold. Focusing on two cases, this talk will address the many challenges faced by university-level educators in the forensic sciences and the benefit of students providing basic forensic services to the community.

POSTER SESSIONS

Implementing the M-Vac to Collect Larger Quantities of DNA from Large Surface Areas

Katie Caswell[*1], B.S., Marc Wander*[*1], B.S., Shane Williams*[*1], B.S, Ruth Ballard[2], Ph.D., Cassandra Calloway[1], Ph.D., Christopher Hopkins[1], M.S., William Green[1], M.D., Sree Kanthaswamy[1], Ph.D, and Edward Panacek[1], M.D.*

**Presenting Authors*

[1]Forensic Science Graduate Group, University of California, Davis

[2]California State University, Sacramento

In forensic science, the collection of cellular material is extremely important. Today, forensic labs use the traditional swabbing, cutting, and taping techniques to recover cellular material. However, these "traditional" techniques have limitations. Large surface area requirements and PCR inhibitors hinder forensic analysts. With a new wet vacuum technique, the analyst can sample large areas and eliminate inhibitors. The Microbial Vacuum System (M-Vac©) is a liquid based biological evidence collection system. Simply, the wet vacuum sprays a sterile buffer while simultaneously vacuuming the liquid with any cellular material that was present on the surface. In our research, we determined whether the M-Vac is more efficient at collecting DNA from large surface areas than traditional methods by determining the amount of DNA collected.

First, we determined how much touch DNA the M-Vac could recover from cotton fabric. Compared to the cutting method (1 cm2 fabric), the M-Vac can collect one sample from 500 cm2. In some situations, the cuttings result in little to no DNA; however, the M-Vac is capable of collecting touch DNA. Second, we tested the M-Vac's efficiency at collecting male saliva from female skin. Traditionally, sexual assault examiners would swab a victim for biological evidence. Compared to swabbing, the M-Vac collects more salivary DNA. Additionally, the M-Vac collects very little of the female's epithelial cells, making downstream STR profiles easier to interpret. Finally, we determined if either method could collect male saliva from a female's skin after showering. Both methods were successful in collecting the male saliva after showering. Though neither method was superior, we still observed full Y-STR profiles from the male contributor for both methods. The M-Vac makes the collection of biological evidence from skin and fabric plausible without being hindered by surface area limitations. The M-Vac has the potential to be more effective when the location of biological evidence is unknown, an area where traditional collection methods continue to fall short.

DNA Allele Frequencies of the AmpFℓSTR® Identifiler® STR alleles in the Luo, Kalenjin, and Kamba Tribes of Kenya

Rachel Gordon[*1], B.S., Merces Reed[2], Sophie Mukwana[1], M.S., Josh Xiong[2], Sree Kanthaswamy[1], Ph.D., Bob Rice[1], Ph.D., Ruth Ballard[2], Ph.D.*

**Presenting Author*

[1]Forensic Science Graduate Group, University of California, Davis

[2]California State University, Sacramento

My project determined the frequencies of the AmpFℓSTR® Identifiler® STR alleles in three large tribes in Kenya. With the help of Sophie Mukwana, I collected buccal swabs from 200 members of the Luo, Kalenjin, and Kamba tribes. I transferred the saliva from buccal swabs to Qiagen 4-spot FTA where the DNA was stabilized at room temperature.

I used these samples to generate allele frequency databases for each tribe. After validating these databases to ensure all loci are in Hardy-Weinberg Equilibrium, I statistically compared them to one another. I also statistically compare the databases to three other databases: the United State's African American database and the two unpublished databases for the Luhya and Kikuyu Kenyan tribes. This analysis can help determine whether the Luo, Kalenjin, and Kamba databases can be merged with databases for other Kenyan tribes. We determined the databases are significantly different from one another and from those of the Tanzanian, African-American, Kikuyu, and Luhya populations against which they were compared. The compiled database(s) will be a useful tool for solving crimes in the United States that involve Kenyan immigrants. The database(s) will also help the Kenyan government uphold its laws and protect the safety of its people.

An Evaluation of STR DNA Typing and Possible Contamination Following Latent Print Processing

Vanessa Meneses[*1], Catherine Nguyen,PhD[2]; Rebecca Berlin, MSFS[2]; Allen C. Brogdon, MFS[2]; Lisa M. Brewer, MS[2]; Katherine Roberts, PhD[1]*
[1]California State University, Los Angeles
[2]Verdugo Regional Crime Laboratory
**Presenting Author*

With fingerprint and DNA evidence often occurring at the same crime scenes, it is necessary to investigate how collection of one affects the other. The goal of the study is to examine the relationship between latent fingerprint collection and the analysis of touch DNA. Fingerprint brushes may be an instrument of DNA contamination through direct or secondary transfer. The extent of direct transfer to a surface and existing levels of brush contamination, as well as secondary transfer by fingerprint brushes, were investigated by evaluating the sample for the presence of DNA. Finally, the ability to extract DNA from latent prints transferred to adhesive tape lifts was investigated.

The study found that it was possible to recover DNA on used fingerprint brushes through direct transfer, although secondary transfer was less likely. Partial allele profiles were obtained from the latent prints recovered using adhesive tape; however, levels were below analytical threshold.

Optimization of Extraction Parameters using IMCSzyme β-glucuronidase for Blood Opiate Analysis

Nancy Kedzierski[*1,2], Dani Mata[1]*
**Presenting Author*
[1]Orange County Crime Laboratory
[2]California State University, Los Angeles

A new β-glucuronidase, IMCSzyme, has the potential to reduce the hydrolysis time required for total opiate analysis at the Orange County Crime Laboratory to as little as 30 minutes, compared to the current 3 hour hydrolysis time. The laboratory's standard opiate procedure was used to test the new enzyme, which includes solid phase extraction, drug derivatization, and GCMS analysis.

The independent variables evaluated to assess the potential of IMCSzyme β-glucuronidase hydrolysis for total opiate analysis include the amount of enzyme used for hydrolysis, hydrolysis time, hydrolysis temperature, and sample pH. Based on manufacturer recommendations, the hydrolysis temperature was kept constant at approximately 55°C and the amount of buffer was held constant at a 1:1 ratio with the amount of enzyme added. The initial tests were conducted on pig's blood spiked at a high and low concentration for each of the drugs studied, based on typical ranges seen in case work. The drugs studied were morphine-3β-D-glucuronide, morphine-6β-D-glucuronide, codeine-6β-D-glucuronide, hydromorphone-3β-D-glucuronide, and oxymorphone-3β-D-glucuronide. Four primary experiments were conducted using combinations of the following variables: 100µL or 200µL of enzyme and 30 minute or 1 hour hydrolysis times.

Experiments are still being conducted to determine the optimum conditions, however, preliminary data indicates that 200µL of enzyme and a 30 minute hydrolysis may provide sufficient hydrolysis to meet the laboratory's quality control standards. It has been highlighted in the literature that the bonding configurations of the 6-glucuronide drugs present a greater challenge in obtaining complete hydrolysis. This problem has been observed in experiments performed with the spiked blood samples using the laboratory's current enzyme: however, the preliminary results support that the 6-glucuronide drugs are not as problematic to hydrolyze when using the new -glucuronidase enzyme. Upon completion of the current testing, further tests will be conducted on previously analyzed casework samples, as well as various matrices such as urine samples, post mortem blood samples, and liver samples.

Future testing of this enzyme would also include investigating various extraction buffers. The manufacturer has suggested that there may be potential to further optimize the hydrolysis of the 6-glucuronide drugs, especially codeine-6 -D-glucuronide, by using a phosphate buffer at pH 7.2 rather than the pH 6.8 currently used.

The Contribution of Environmental Conditions to the Formation of Proximal End Root Banding in Antemortem Anagen Hairs

Lino Garcia, Katherine A. Roberts, School of Criminal Justice and Criminalistics, California State University, Los Angeles*
**Presenting Author*

This research investigates proximal end root banding in human anagen head hair from antemortem subjects. Hairs were exposed to various environmental conditions in an effort to identify the factors that contribute to the formation of antemortem root banding. A total of 1050 anagen and telogen hairs from 25 living subjects were exposed to seven different environmental conditions, five of which were controlled environments while other two conditions were chosen to mimic crime scene scenarios. The controlled conditions included submerging hairs in NonopureTM water, normal saline (0.9% NaCl), 3% hydrogen peroxide, talcum powder, and dehydrated soil. The simulated crime scene conditions included placing hairs either in a shower or in buried soil.

The hairs were exposed to each environment for approximately 30 days and subsequently examined by polarized light microscopy for the presence of anagen root banding. The results demonstrate that human head hair from antemortem subjects exhibit root banding characteristics following exposure to specific environments. This phenomenon has previously been described in the literature as a characteristic of postmortem individuals.

This finding is significant as it calls into question the probative value of root banding in discriminating whether hair evidence originates from living or deceased individuals at the time of deposition. Furthermore, this research suggests that the mechanism that contributes to root banding may be attributed more so to the decomposition within the hair root itself rather than the decomposition of body tissue encompassing the hair root follicle.

A Study to Distinguish Buccal and Vaginal Epithelial Cells Using Dane's Staining Method

Chad Eyerly, Katherine A. Roberts, School of Criminal Justice and Criminalistics, California State University, Los Angeles*
**Presenting Author*

Greater probative value may be obtained from sexual assault evidence if the origin of the epithelial cell type can be established. Presently, no reliable methods exist to differentiate vaginal from buccal cell cultures. This study aims to evaluate the potential of Dane's histological staining method to differentiate between vaginal and buccal cell samples by examining staining patterns and morphology. Previous research has shown promising results; however, the sampling method did not replicate typical evidence preparation since they were smeared directly to microscope slides and examined within 4 hours of collection. Typically, sexual assault evidence is collected and stored for extended periods prior to extraction and histological examination.

This study examines whether the differential staining observed with direct microscope smears treated with Dane's staining is replicated with swab extracts that mimic sexual assault evidence. Two buccal and two vaginal samples were collected from pre-menopausal women aged 18 or older. One vaginal and one buccal swab sample was smeared immediately on separate microscope slides while the duplicate vaginal and buccal samples were stored frozen for various periods time prior to extraction and preparation for histological staining. The results of the differential staining of buccal cells (bright orange-pink with red nuclei) and vaginal cells (bright orange with orange nuclei and a blue extracellular hue) will be discussed. This presentation will also discuss the acid phosphatase and amylase testing that was performed on the supernatant from the extracted vaginal and buccal swabs.

The Capability of Raman Microspectroscopy to Differentiate Printing Inks

Chelsea E. Johnson, School of Criminal Justice and Criminalistics, California State University, Los Angeles*
**Presenting Author*

Ink analysis is an important component in the forensic investigation of questioned documents. This study explores the ability of Raman microspectroscopy to differentiate the chemical components in printing inks of different brand, color, and type using the 532 nm and 785 nm excitation wavelengths. Spectra were collected from 320 different colored inkjets, toners, offset, and intaglio inks manufactured under various brand names. After collecting the data, each spectrum underwent several comparisons to construct confusion matrices from which discrimination capability percentages were calculated. Since more of the inks elicited a signal using the 785 nm excitation wavelength, only the results collected with this wavelength were used in the calculations for the discrimination capability.

The results show that Raman microspectroscopy is best suited for differentiating among the inkjet and intaglio ink types, which exhibit discrimination capabilities of 92% and 94%, respectively. Within each ink type, the yellow and magenta colored inks had the highest chemical variation, leading to discrimination capabilities high enough to allow for the potential identification of each ink brand. Cyan inks were often indistinguishable due to their similar chemical components while black inks often did not elicit a Raman signal, leading to low discrimination capabilities for these colored inks. Raman microspectroscopy was found to be unsuitable for differentiating between offset inks, as the discrimination capability for each of the same-colored inks was low. The technique is also unsuitable for differentiating between toner inks, as the majority of the toners analyzed in this study did not elicit a Raman signal. Additionally, Raman microspectroscopy was able to identify the pigments copper phthalocyanine and carbon black in some inks.

Raman microspectroscopy offers a nondestructive, discriminative technique that requires little sample preparation and small sample size. The potential exists to identify the manufacturer of certain inks using this technique, making it an important method for use in a forensic laboratory.

Keywords: forensic ink analysis, Raman microspectroscopy, discrimination capability, confusion matrix, questioned documents.

Development of a Database to Characterize the Density of Nail Polish Samples by Magnetic Levitation

Elisa Martinez, Katherine A. Roberts, School of Criminal Justice and Criminalistics, California State University, Los Angeles*
**Presenting Author*

This study describes a simple and non-destructive method to characterize the density of nail polish samples using a magnetic levitation (MagLev) technique. The nail polish samples consisted of a range of colors from several manufacturers. Dried nail polish samples were placed in a 3M MgCl2 paramagnetic solution and allowed to levitate in between two permanent NdFeB magnets. The levitation heights were measured using ImageJ software and the density of each sample was calculated by comparing the sample data to a standard density bead linear regression curve.

The purpose of this study was to compile a database of the density value of nail 83 polish samples from seven different manufacturers. It was also important to determine trends and/or correlations in the density values with respect to color and/or manufacturer brand. This study also compared the density of nail polish samples collected from a microscope slide with *in situ* sampling of the same nail polish from a fingernail. This presentation will also include the ATR-FTIR analysis that was performed on the nail polish samples.

Fingerprint Identification and Error Rate Estimation Based on the Congruent Matching Cell (CMC) Method

Wei Chu, John Song, Melissa Taylor, Robert Thompson*, Johannes Soons, National Institute of Standards and Technology*
**Presenting Authors*

The Congruent Matching Cell (CMC) method is an ap-

proach originally developed at the National Institute of Standards and Technology (NIST) for the accurate forensic identification of firearm toolmarks. The CMC method is applied in fingerprint identification aiding in the evaluation of the strength of fingerprint evidence by providing a technique to determine the random match probability of fingerprint evidence as well as the probability of false positives and negatives. In this presentation, we describe promising initial results on the application of the CMC method to fingerprint identification.

The CMC method for comparing two samples is based on the correlation of pairs of small cells instead of the entire sample. Two sets of cells are a congruent matching pair if they have a high degree of similarity, typically expressed by the maximum value of the area cross correlation function (CCFmax), and if their registration position and orientation is consistent with those of other congruent cells. Thus there are three sets of parameters identifying cell pairs originating from the same source: the CCFmax value, registration position x and y, and registration angle θ, with associated thresholds TCCF, Tx, Ty, and Tθ;. An identification requires a certain minimum number of congruent matching cells (CMCs). We observed that the correlation of cells instead of the entire surface yields a good statistical separation between the number of CMCs for matching and non-matching samples, even if major sample areas have missing features. The CMC method also enables an approach to estimating error rates. The combined false positive and false negative identification probability for each correlated cell pair, P1 and P2, can be estimated from the statistical distributions of the three sets of identification parameters and their thresholds. These probabilities are then used to estimate the probability of a false exclusion or false identification for a given number of compared cells and observed CMCs.

After modifications, the CMC method was applied to fingerprint identification. 44 fingerprint images randomly selected from the NIST fingerprint (10-print) database were compared. Each fingerprint image was divided into a cell array with an average of 225 cells. The number of CMCs for the 924 known non-matching (KNM) fingerprint pairs were distributed in a range from 0 to 5. The number of CMCs for the 22 known matching (KM) fingerprint pairs were distributed in a range from 8 to 60.

The initial results show significant separation between the KM and KNM CMC distributions, and no false identifications or false exclusions were made. We expect to obtain a wider separation after tailoring the registration algorithms and CMC criteria to fingerprint patterns. Error rate estimation will require tests on larger and more varied fingerprint sets to estimate typical "local" cell matching probabilities in the patterns for images of various quality levels. It avoids errors introduced by incorrect feature identification, which lowers identification accuracy when comparing imperfect fingerprint images.

A Study to Optimize the Quantitative Analysis of Carisoprodol and Meprobamate by Gas Chromatography-Mass Spectrometry

Stephanie Gipson[*1,2]
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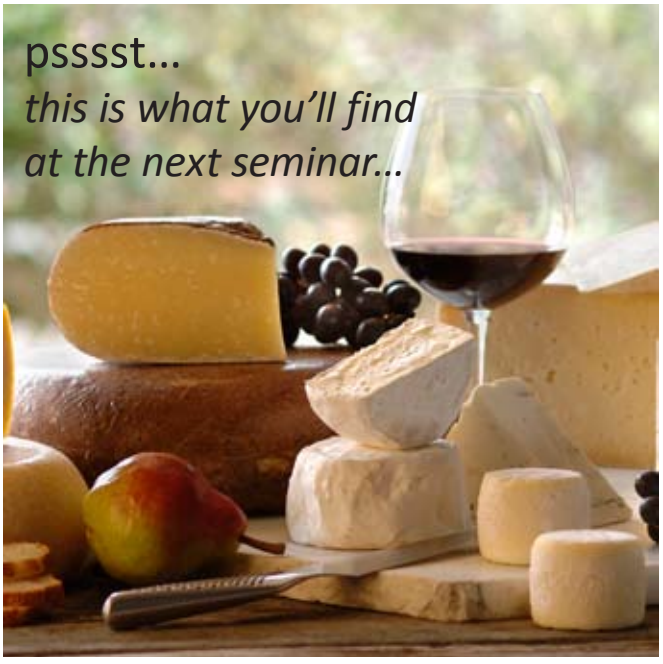
Carisoprodol is a muscle relaxant prescribed for the treatment of acute musculoskeletal pain. It is also a CNS depressant often prescribed for its sedation effects. Meprobamate, a major metabolite of carisoprodol, is also considered a CNS depressant that is approved for the management of anxiety disorders. Carisoprodol (trade name Soma) is commonly mixed with aspirin or codeine. The National Highway Traffic Safety Association indicates that Soma can impair the mental and/or physical abilities required for driving a motor vehicle. Incidents of Soma abuse have increased and the drug was reclassified as a Schedule III drug in 2012. As a result, reliable quantitative method to analyze the drug in impaired drivers is warranted.

Many non-deuterated internal standards have been explored for quantifying carisoprodol and meprobamate due to the unavailability of deuterated internal standards. These non-dueterated standards include, but are not limited to the following: etidocaine, lidocaine, tybamate, benzylcarbamate, and prazepam. Published studies report a variety of non-deutereated internal standards lack the chemical and physical similarities desired for quantitative analysis. Current validated methods employed by the Los Angeles Sheriff's Department utilize prazepam as the internal standard in conjunction with a Toxi-tube extraction, which yields a measurement of uncertainty of 39%.

This research investigates a modification of the existing analytical method by employing Carisoprodol-D7 and Meprobamate-D7 as the internal standard. Additionally, optimal extraction conditions were explored by comparing the effectiveness of Toxi-tube and Biochemical GV65 solid phase extraction columns across several performance measures. The validation parameters that were addressed include specificity, linearity, stability, sensitivity, accuracy, precision, sample carry over, and sample recovery. Triplicate analysis of fortified blood and urine samples was assessed for both extraction methods to determine the best analytical method for quantitative performance using gas chromatography-mass spectrometry.



Sonoma County Tourism

Ethical Dilemmas

Discussion Corner with Carolyn Gannett

I support revision of paragraph IV.D of the CAC Code of Ethics

That Bloody Knife!

The Scenario

Nancy has been hired by the defense to search for exculpatory evidence in a vehicle. It is owned by a defendant who is charged with homicide in a stabbing death. The vehicle has already been searched by the public laboratory and released to the defendant. While searching the vehicle, Nancy discovers a bloody knife shoved between a seat back and cushion.

What should she do with the knife? Should she disclose it in her written report? Can (or should) she speak of the knife to anyone outside of the defense team?

The Short Answer

In my opinion, Nancy should document all her observations and results in her notes and report all to the defense attorney. They should include the observation of the knife and whether she removed, touched, or otherwise altered it. If she did any of these things to the knife, she should document and report the original location and condition of the knife, and expect the defense attorney to eventually take possession of the knife for disclosure to the prosecution. If she provides a written report, all of her observations and results should be included. Regardless of her reporting medium, whether written or verbal, she should not disclose her observations or results to anyone outside of the defense team unless legally required to do so.

If you do not agree (or even if you do), I encourage you to share your views via the CAC Ethics Forum *(www.EthicsForum.CACNews.org)*. Bear in mind that I have never worked as a defense expert nor am I a criminal law attorney. This topic is being offered for the purpose of stimulating discussion and raising awareness, rather than as a definitive resource on defense discovery. Consult with defense experts or lawyers before applying any ideas in this article to real situations.

Discussion

Forensic scientists exist to serve the justice system (hence, the adjective "forensic" in "forensic scientist"). That system is an adversarial one. How it functions, including discovery rules, is defined by legislatures and judicial experts. Discovery rules are fundamental to that system, so it would be wise for the forensic scientist to have at least a rudimentary understanding of them. Also, an adequate resolution to this scenario requires some knowledge of discovery rules. So, here is a simplistic primer on California's discovery rules.[1,2,3]

Discovery Rules in a Nutshell

The prosecution must fully disclose to the defense the results of public-lab experts and private experts hired by the prosecution. But, the defense need not disclose a defense expert's results to the prosecution unless that expert's name appears on the defense attorney's witness list. The defense may thereby bury incriminating (or other unused) results by leaving the expert's name off that list. This is both legal and legally ethical. It allows the defense to conduct independent examinations without being forced through disclosure to incriminate its own defendant. Incrimination is the responsibility of the prosecution, not the defense.

If an expert who is named on the defense's witness list has not prepared a written report or notes, then the defense must provide the prosecution with a synopsis of the expert's expected testimony, or else allow the prosecution to interview the expert prior to trial.[2] I have argued in the past[4] that not preparing a written report for disclosure may not serve justice to the best of the expert's abilities—a concept expressed in the CAC Code of Ethics[5] and other ethics documents.[6] So, not preparing a written report may fall short of some ethics standards. A written report serves the justice system, because it ensures that the criminalist's observations and results are not subject to any discrepancies that might occur should a defense attorney inaccurately or incompletely summarize them for the prosecution. And, it avoids any discrepancies, oversights, or misunderstandings that could occur during an interview with the prosecution.

That the defense may bury incriminating results, while the prosecution must disclose all, may initially grate against our scientific values of being forthcoming and objective. But, as forensic scientists we best serve justice by operating within the legalities of the justice system we serve. And, that grating feeling dissipates upon understanding that the justice system, in fact, does not hinder our ability to always be forthcoming and objective. It just defines differently to whom we must and must not be forthcoming: it depends on who retained us—a necessary characteristic of the adversarial justice system. Objectivity[8] applies to the expert's analyses and reporting, not to the mistaken notion that both sides should be subject to the exact same disclosure rules.

To practice ethically, a defense expert can be forthcoming[7] by reporting all observations and results to the client, can be objective[8] by conducting examinations and reporting results in an unbiased manner, can maintain confidentiality[9] by respecting the attorney-client privilege and work-product rules, and can serve justice to the best of one's abilities[6] by adhering to ethical and legal requirements.

There are exceptions to the defense's right not to disclose. For example, if the defense, including a defense expert, removes or alters evidence, its original location and condition must be disclosed by the defense attorney to the prosecution[3] (the defense attorney need not disclose hiring the expert who found it). "Removes" may include moving and then immediately replacing, and "alters" may include simply touching. If the usefulness of the evidence cannot be determined without testing, the defense may retain the evidence for a reasonable time to complete the tests before handing it over to the prosecution[3]. However, if the defense or the defense expert merely observes, but neither removes nor alters evidence, it need not

be disclosed no matter how incriminating. It is left intact for the prosecution to find it.

If the prosecution never finds it, that smoking gun or bloody knife may legally and ethically never be made known inside a court of law. This is justice being best served, as determined by the entities responsible for deciding how justice is best achieved. This may seem wrong to the average Joe. But, those entities are taking into consideration the necessity that certain confidences must be maintained in order for an adversarial system to best mete out justice.

Support for "The Short Answer"

To be ethical, Nancy would fulfill the forensic science ethics principles of being forthcoming[7], objective[8], confidential[9], and serving justice to the best of her abilities.[6]

Reporting *all* her observations and results to the defense attorney addresses being forthcoming.

Conducting her examinations and tests i*n an unbiased manner* addresses objectivity.

Reporting all her observations and results *using the same medium* also addresses objectivity. By "the same medium" I mean reporting all in writing or all verbally. Different media would be reporting some in writing while reporting others verbally. I'll say more on reporting results in the next section.

By disclosing her results *only to the defense team and to those to whom she is legally required*, she addresses the principle of confidentiality.

By *reporting whether she removed or altered the knife*, she provides the defense with the information needed to determine whether the knife must be disclosed. And, by including the original location and condition of the knife, she provides the defense with the information that must be provided if the knife must be disclosed.

By *adhering to the attorney-client privilege, work product rules, and forensic science ethics*, she serves justice to the best of her abilities.

But, the work request was only for "exculpatory evidence"

What if Nancy merely observed the knife, never moved or touched it, and she held a written work request that stated "search for exculpatory evidence?" Because the knife appears to be inculpatory, rather than exculpatory, do the stated limits of the work request excuse her from reporting it to the defense attorney? Do those limits allow her to verbally report the observation of the knife, but excuse her from including it in a written report?

As outlined above, the principles of being forthcoming and objective may not be met if the knife is not reported and if it is not included in a written report (if produced). Also, I have argued in the past that the ethical criminalist does not rely on a request from a non-expert to define the scope of the expert's work.[10]

Yes, the bloody knife looks pretty bad for the defendant. But, who is Nancy to judge that it is not exculpatory? Maybe it is. Maybe the bloody knife is the one piece of evidence that can prove that the defendant did *not* do it. It may contain fingerprints and DNA evidence incriminating someone else. She cannot know this without reporting it so that tests can be done. She would actually *not* be fulfilling her work request if she did not report it.

What if "a miscarriage of justice might occur?"

I have argued that Nancy should not disclose her results to anyone outside of the defense team unless legally required to do so. But, the CAC Code of Ethics, IV.D, states: *"Generally, the principle of 'attorney-client' relationship is considered to apply to the work of a physical evidence consultant, except in a situation where a miscarriage of justice might occur. Justice should be the guiding principle."*

I understand this to say that the attorney-client privilege may be violated by the defense expert if he or she thinks that a miscarriage of justice might otherwise occur. This clause leaves a heavy burden of judgment on the defense expert's shoulders in each and every case in which the expert's results will not be disclosed. The expert is made ethically responsible for determining whether a miscarriage of justice will occur if the expert's findings are not disclosed to the prosecution or the court.

In our scenario, this would mean that if Nancy thought that the defendant might get away with murder because the knife would legally never make it to court, then she has an ethical responsibility to disclose it to the prosecution or the court.

But, when it comes to the justice system, Nancy is just another average Joe. It is not for her to decide how justice is to be met. That is left to legislatures and judicial experts to determine. It is the forensic scientist's ethical responsibility to *serve* the justice system, not to second-guess it.

There may have been a time in the past when disclosure rules were less clear and paragraph IV.D was useful. But, over the years, judicial experts have leant enough clarity and detail to disclosure rules to make this paragraph obsolete. It now conflicts with other content in the CAC Code of Ethics that promulgates serving the interests of justice.[6] For these reasons, I support revision of paragraph IV.D of the CAC Code of Ethics.

Summary

I have presented the above ideas with the purpose of stimulating discussion and broadening awareness. As I said at the opening, I have never done casework for the defense, and I am not a criminal lawyer. So, consider this article not as a source of knowledge, but a starting point. Those of you who have experience in private practice or criminal law may have important insights to add to this discussion. I encourage you, and anyone else, to share your ideas through the CAC Ethics Forum, at *www.ethicsforum.cacnews.org*.

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