

The background of the entire page is a dense pattern of red blood splatters of various sizes and shapes, scattered across a white background. The splatters are most concentrated in the upper half and become sparser towards the bottom.

The CACN News

News of the California Association of Criminalists • Fourth Quarter 1998

PITFALLS IN BLOODSTAIN PATTERN INTERPRETATION

The President's Desk

This newsletter's address has been next to impossible to formulate, three incomplete drafts are on my laptop. Seemingly 50,000 thoughts racing through my head and not enough space for all of them. So, if you will indulge me I will simply "snipet" away.

"Why do you say what you say?" My son Mike was telling me about a ride at Great America called "The Drop Zone" in which you are dropped about 22 stories in a seat before coming to a screaming halt. He has a friend who rode the ride and Mike told me, "if you place a penny on your knee on the way down, it will hover right above your knee." Incredulous, I asked him how he knew, or better yet how he knew his friend knew?

Have you ever been guilty of saying something you weren't sure was true or verifiable? I think it goes without saying we all have done so at one time or another. In our business, that's a dangerous thing and I am not just referring to evidence examinations, either.

I am referring to anecdotal statements assumed to be fact which kill perfectly reliable methodologies simply because one doesn't wish to take the time and energy to learn. I am referring to those forensic watchdogs who don't have one-quarter the experience of a trained examiner and then rip these examiners for the work they did or did not do. And then when the charges they have leveled turn out to be little more than baseless accusations are these same people as vigorous in their apologies? Not often. Rather they blanket themselves in an "insulation of accountability." Well, accountability does not give us the freedom to soil another's reputation without factual cause.

We are extremely careful in how we report evidence examinations. We train our examiners in courtroom testimony. We need to exercise the same care in all our speech. Words can't be taken back. If we wish to be considered persons of integrity, we must "be sound in speech which is beyond reproach." (Titus 2:8)

"The ever elusive target." I love stories, so here's another. I always dreamed of being a major league pitcher. When I first started practicing I still remember what my dad jokingly told me, "You couldn't hit the broad side of a barn from the inside." It's true to this day. When I test fire guns I need a tripod, gun rest and a spotter!

I'm beginning to think that way about ASCLD/LAB standards and I am not alone. The standards have been written sufficiently vague to allow for variability among member laboratories in procedures and methods. Unfortunately, the inspectors are neither blessed with the knowledge or time to learn all these procedures and methods. So, they are in essence forced



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Too much definition in their standards and they'll be accused of trying to make every lab a clone. Too little definition and it'll be looked akin to simply rubber stamping accreditations. ASCLD/LAB doesn't wish to venture to either extreme (thank goodness) but there is far too much room in between to allow for a consensus. It appears time to readdress the standards, determine the critical issues within each standard necessary to meet it, and define those crucial elements so well that there

is no room for misinterpretation or misapplication of the standard.

The alternative would be to place more emphasis on a laboratory's overall QA and QC program and less emphasis in pinpointing every detail in their methods and procedures. It may be difficult to have knowledge of all procedures, but the elements of a properly functioning QA and QC program are, or should be, known by all. Maybe more time can be spent dealing with this issue.

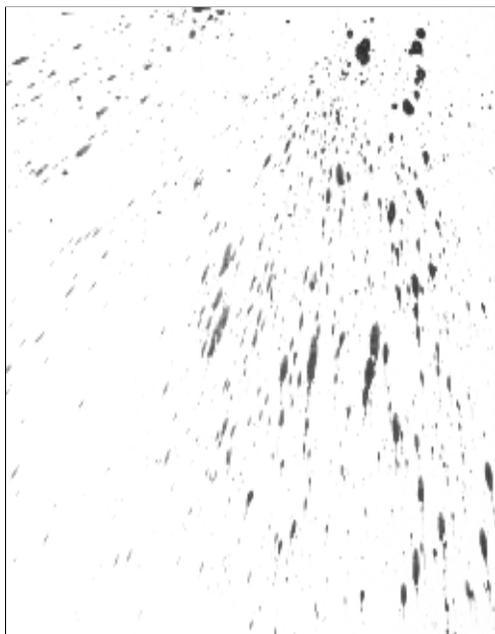
"It is no longer accepted in general by the forensic science community." True only because as can be readily seen, the community of forensic science is ceasing to exist in its classical sense and being replaced by a collection of forensic specialties. This has severe implications for certification, accreditation and our profession. Indeed, it will soon get so bad that like military intelligence (only kidding) or governmental integrity (wish I were kidding) we too will have our own oxymoron, a specialty field called generalist! This will be the one who can tie the whole case together. Kind of ironic, huh? We can avoid this through education, training and mentoring.

And on that note I wish to take a little time to bid a fond farewell to a colleague, Jerry Chisum. Jerry is retiring from over 30 years of service at California DOJ in October, 1998. He has been through quite a bit and has touched many more careers than he could imagine. He has been instrumental in much of my technical and philosophical development which I have in turn passed on to others whom Jerry has not had the pleasure of training. I still remember one lunch we had at a Subway during a class. Jerry mentioned how the two most important things in life were devotion to one's family and God. Work was far down on the list. Yet it is precisely of one's devotion to family and God that one can be so successful in their career as Jerry has been. Sound like an oxymoron? It isn't. It's a simple truth. Jerry, the profession will miss your daily efforts and contributions as will I. But your model will be present everyday in those whom you have touched. May God richly bless and reward you and your family.

Row

Fourth Quarter 1998

C O N T E N T S



On the cover...

Detail from "Experiment #9 Medium Velocity Blood Spatter Horizontal Target." Courtesy Edwin L. Jones, Jr.

The CACNews

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The CACNews is published quarterly (January, April, July, and October) by the California Association of Criminalists, a private foundation dedicated to the furtherance of forensic science in both the public and private sectors. Please direct editorial correspondence to the Editorial Secretary. ©1998 The California Association of Criminalists

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Australian Methods Highlighted

A CAC Northern Section dinner on June 17 was hosted by Forensic Science Associates at the Waterfront Plaza Hotel in Oakland. Featured was Dr. Morris Odell of the Victoria Forensic Medicine Inst. in Melbourne, Australia. In attendance were representatives of a diverse range of forensic science experience—Dr. Odell from Australia, Anatoly Zolotaryov who was formerly a forensic scientist in Russia, and Tom Fedor and Linda Wraxall both of whom formerly practiced in England. With colleagues from private, city, county and state labs in California, we were told how every victim of a violent crime is examined by a physician whose specialty is forensic medicine. In a facility that would be the envy of even Sacramento County criminalists, and with a case load about one third of the City of Oakland's, all people who come to the attention of the police and have any medical problems are offered treatment and an examination directed to documenting findings which might be significant in future litigation, collecting evidence for laboratory examination (either the Forensic Medicine Institute or the Victoria Forensic Science Inst.), and providing each person with all appropriate medical care.



Famous Cases Presented

In the Southern Region, a dinner meeting was hosted on June 11, by the Ventura County Sheriff's Crime Lab at the Ventura Community College. After a busy day of study group meetings, including John Simms' (right) presentation on ASCLD-LAB accreditation, the group listened to Edwin L. Jones, Jr. (below, left) highlight a sequence of interesting historical cases. Ed told the stories of the Siskiyou Train Robbery, the Sam Sheppard case, the Sacco and Vanzetti case and even the Lindbergh kidnapping. Hearing the familiar cases told from a criminalist's point of view gave insight into approaches that might prove useful in processing modern cases.



Above: Pete Barnett, below: CACNews

Jobs • Meetings • Courses

Senior Criminalist Position Offered

Forensic Analytical has a unique opportunity available for an experienced criminalist. Working in the private sector with highly respected forensic scientists in the industry, the successful candidate will be exposed to casework from the generalist perspective, and have the opportunity to help shape a growing reliance on private sector support to both the prosecution and defense.

The candidate must possess a degree in a physical science and /or forensic science, and a minimum of five years within the criminalistics profession, preferably with trace evidence knowledge, skills and abilities. Firearms examination knowledge is also a desirable skill. The successful candidate will have the flexibility of placement in either our San Francisco or Los Angeles location.

Forensic Analytical is an Equal Opportunity Employer, offering a competitive benefit package, and an excellent opportunity to practice criminalistics in the private sector. Please forward your resume and salary history to our San Francisco address. Salary DOE.

For further information, contact: Forensic Analytical, Chuck Morton, Laboratory Director, 3777 Depot Road, Suite 409, Hayward, CA 94545 1-800-827-3274 e-mail: cmorton@forensica.com. Carol Hunter, Laboratory Supervisor, 2959 Pacific Commerce Dr., Rancho Dominguez, CA 90221 310-763-2374 e-mail: chunter@forensica.com

Two Openings for City of Tulsa

Tulsa Police Department Forensic Laboratory has two openings for criminalists, one a generalist and the other with a concentration in toxicology. Contact Dennis Jones, for an application or Carla Noziglia for technical information: Dennis Jones, Personnel Analyst, City of Tulsa, 200 Civic Center, Tulsa, OK 74103, (918) 596-7436, 596-1829 FAX or Carla Noziglia, Laboratory Director, Tulsa Police Department, 600 Civic Center, Tulsa, OK 74103, (918) 596-9128, (918) 596-1875 FAX.

Openings Announced for Washington

The Washington State Patrol Crime Lab has the Forensic Science 2 and 3 registers open with anticipated positions in Marysville, Kennewick and Kelso for experienced persons in chemistry and firearms. Also, the Forensic Documents Examiner 1 register is currently open with an opening in Marysville. Experienced document examiners are encouraged to contact Kevin Jones for information about other forensic document examiner opportunities with the Washington State Patrol Crime Laboratory. Kevin Jones (email kejonas@wsp.wa.gov)

Northwest Meeting in Idaho

The fall meeting of the Northwest Association of Forensic Scientists (NWAFS) will hold their fall 1998 meeting in Sun Valley, Idaho on October 5-9. Contact Don Wycoff at (208) 232-6364.

Assist. Prof. of Chemistry

\$31,000-48,000. Westchester University seeks a PhD. (analytical or biochemistry) with forensic laboratory experience. A record of research productivity is essential. Application deadline Oct 23rd. Contact Helen Reid, Chemistry Dept, Westchester Univ., Westchester, PA. 610-436-2881, FAX 610-436-2890.

San Diego Police Need Lab Manager

The San Diego City PD seeks a Crime Laboratory Manager, \$85,000 to \$95,000 depending upon qualifications. This position is an at will, management position reporting directly to an Assistant Police Chief. Desirable candidates will have substantial management and/or supervisory level experience with responsibility for crime lab operations, be familiar with and able to meet and maintain national accreditation requirements, possess strong problem solving skills, excellent communication skills, and the ability to maintain positive working relationships. For brochure & required supplemental questionnaire, contact Cathy Lexin, Police Personnel Director: phone (619) 531-2940; fax (619)531-2530; or internet: ctl@sdpdms.sannet.gov. Application materials due by 5:00 p.m. on Wednesday, September 30, 1998.

The following announcements are gathered from the internet and have not been verified for accuracy.

Hair Testing (Tox) Workshop

Advanced Hair Testing Techniques And Applications. A Motherisk Workshop Oct. 1 - 2, 1998, The Hospital For Sick Children, Toronto, Canada.

See the website at http://www.motherisk.org/coming_events/

Dr. Thomas Clarke, University of Rochester, N.Y. John Hill, Barrister & Solicitor, Toronto Dr. Pascal Kintz, Secretary, Society of Hair Testing, Inst. de medecine legale, Strasbourg, France Dr. Giulia Manetto, U. of Verona, Inst. of For. Medicine Dr. Thomas Mieczkowski, Professor of Criminology, U. of South Florida Dr. Christine Moore, U.S. Drug Testing Lab, Chicago. Dr. Aldo Poletti, U. of Pavia, Dept. Legal Medicine Dr. Hans Sachs, President, Society of Hair Testing, Institut für Rechtsmedizin, Munich, Germany

Trace Analyst Position in NY

Openings anticipated in the trace evidence section for Forensic Scientist or Asst Forensic Scientist. Min. req. for the Forensic Scientist title is a BS degree in a relevant natural science which includes a minimum of 20 credits in chemistry and 3 yrs of appropriate experience working in a forensic science lab or a MS degree in a relevant natural science, a minimum of 20 credits in chemistry and 2 years of appropriate laboratory experience. The minimum requirements for the Asst. Forensic Scientist are the same except for requiring two fewer years of experience with either degree.

Preference will be given to applicants having specialized training in the analysis of hair, fibers, soil, glass, paint, gunshot residue or fire debris. ABC certification is desirable.

The salary ranges for Forensic Scientist and Assistant Forensic Scientist are \$39,940 - \$53,035 and \$37,355 - \$46,460, respectively. These are 1995 salary scales. A new union contract is imminent. Contact: Thomas J. McGimpsey Director of Admin Svcs Westchester County Dept of Laboratories & Research, 2 Dana Road, Valhalla, NY 10595.

Please turn to page 10



J. D. Dana, mineralogist, subject of talk

Wayne Moorehead presented a lecture on the remarkable life and accomplishments of James Dwight Dana, (1813-1895), American geologist, mineralogist and zoologist. Dana's list of writings includes 214 books and papers beginning with a paper on the conditions of Vesuvius in 1834 and ended with the fourth revised edition of his *Manual of Geology*. The lecture by Wayne Moorhead was given to the Microscopical Society of Southern California in August.

Notes from the 1998 Nor-Cal Arson Seminar

The annual Nor-Cal Arson Seminar met on Wednesday, April 22 in Modesto. Sarah Yoshida of DOJ-Ripon hosted the meeting. Criminalists, investigators and one assistant DA representing eleven laboratories and agencies were in attendance.

The State Fire Marshall's Office presented an accelerant demonstration in the morning led by Supervising Investigator Joe Konefal. The demonstration was highlighted by a scheduled burn of a structure on Modesto Junior College Campus. The burn was located next to the site of the old DOJ-Modesto Laboratory building which was burned to the ground in a previous scheduled burn. The bullet tank and the back steps were about all that remained.



Bradley Johnson

Steve Bentley reminisces about the "good old days."

During the afternoon session, several presentations were given concerning a wide variety of interesting topics related to arson analysis. Special thanks to Brad Cooper of ATF-Walnut Creek, and Brad Johnson of Sacramento County Laboratory of Forensic Services for moderating the presentations and meeting.

Thanks to everyone who helped make this event so successful.

The second annual

Nor-Cal Explosives Seminar is scheduled for Oct 28, 1998 in Walnut Creek. The ATF Walnut Creek laboratory at 355 N. Widget Lane will be hosting this event. There will be peer presentations, a round-table discussion and an informal luncheon.

If you would like to attend, please contact **Brad Cooper** (510-486-3170) or **Brad Johnson** (916-874-9240) for more information.

Selected Ion Monitoring: How to Find an Accelerant in a Sea of Pyrolysis Products

Pyrolysis products from substrates in arson evidence can often produce patterns that are hard to interpret or that mask accelerants present in low levels. In one recent case, a single item of evidence was submitted from a garbage can fire. It was suspected that gasoline had been used to start the fire. The evidence submitted consisted of several hard pieces of apparently charred, melted plastic. A slight odor was associated with the item but it was hard to characterize and even might be attributable to the substrate.

A scan mode mass spectral analysis of an extract from the evidence produced a total ion chromatogram with numerous peaks. The most abundant compounds were a series of alkene/alkane doublets. These obviously originated from the substrate. A few peaks characteristic of gasoline were discernible, but they were present at lower levels, were masked by the alkene/alkane doublets, and the relative abundances were hard to compare.

The same extract was analyzed again using a selected ion monitoring mode (SIM) looking only for eight ions that are characteristic of various families of compounds found in gasoline. Gasoline standards were also analyzed using this same SIM method. This analysis effectively eliminated the contributions from the pyrolysis products and produced a chromatogram that was used to conclusively identify the presence of gasoline in the sample.

Diane Bowman

Washoe County Sheriff's Lab.

HPDs in Gasoline?

During the past year our laboratory has had a few cases where detectable amounts of a heavy petroleum distillate



Bradley Johnson

Joe Konefal lights a molotov cocktail

(HPD) was found with gasoline. Almost all of these samples were heavily evaporated, where the lighter end of the gasoline chromatogram was gone and the xylene peaks were significantly less abundant than pseudocumene (1,2,4-trimethylbenzene). It was the aim of this experiment to see if trace amounts of HPDs were present in gasoline. Various samples and brands of gasoline taken over the past two years from different locations in northern CA were evaporated to about 2% of its original volume. Liquid samples were injected into the capillary gas chromatograph under standard conditions.

It was found that in some samples an HPD was detected that varied in intensity relative to the gasoline peaks. Samples were also taken from two gasoline cans stored in garages in two different cities. Each container was strictly filled with gasoline from a local gas station. One of these samples showed detectable levels of an HPD.

When trace amounts of an HPD are detected in gasoline, certain questions are raised. For instance, at what point is the HPD added to the gasoline? Is it in the production or distribution process? Did the end user accidentally mix an HPD with gasoline? Or is the HPD from a different source entirely? Could the HPD have been introduced onto the substrate at an earlier time? Some of these questions can be answered, but finding answers for other questions may be difficult or impossible to do. [Editor's note: This should give pause to reporting out

a mixture when only low levels of diesel are observed in gas. Also, low levels of gas have been observed in diesel.]

Mark Moriyama

Some Experiments on Pre-production Samples of the New Kapak Fire Debris Bags

About a year ago, Kapak Corp., who was a major supplier of fire debris bags, stopped selling this product. This was due to the termina-

tion of the contract with the materials supplier. Since then, Kapak has begun to manufacture their own materials for the production of these bags. Some limited production fire debris bags were provided to this laboratory for testing by Kapak's market manager Sheldon Saffe.

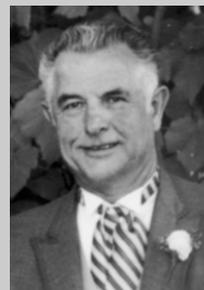
Two experiments were planned, which consisted of a background test and a leakage test.

The purpose of the background test was to identify if the packaging material added any peaks to the chromatogram. In this test, a charcoal strip was placed in two sets of fire debris bags. One set of bags was held at room temperature and the other set was heated in a 60deg C oven for about 48 hours. The room temperature samples showed no appreciable contribution from the fire debris bag. The heated samples showed a doublet around C10 and a cluster of peaks between C17 and C18 at low attenuation. This type of pattern was observed before in previously obtained Kapak fire debris bags.

The purpose of the leakage test was to determine if any ignitable liquid could escape the sealed fire debris bag. One milliliter of gasoline was placed on a clean Kimwipe, which was then heated sealed in the fire debris bag. The bag was then placed with a charcoal strip in a metal can and sealed. Samples were held at room temperature or heated in a 60deg C oven for about 48 hours. Though the charcoal strip picked up some volatiles from the can, no significant Gasoline peaks were detected. Both experiments were repeated with similar results.

Mark Moriyama
Santa Clara Co. Crime Lab

The Alfred A. Biasotti Best Presentation Award



The board of directors unanimously approved honoring the memory of Alfred A. Biasotti by placing his name on the CAC seminars Best Presentation Award. Al died on June 24,

1997 but his legacy and contribution to the field of criminalistics will be memorialized by having his name associated with this award. (See Lou Maucieri's article in the *CACNews*, Fall 1997 issue.) Al's contributions to forensic science are too numerous to mention, however, some of his more notable accomplishments are listed below:

- Implemented the use of the Intoxilyzer for DUI cases in all DOJ labs
- Chair AFTE peer group committee to define expert certification
- Designated key Member of the Year by AFTE (1981)
- Contributed 34 technical articles to 5 different journals
- Designed, produced and instructed first DOJ Forensic Academy class for new employees
- Served as a consultant and helped define procedural guidelines for DOJ's shooting review board
- Defined test and acceptance criteria for body armor procured for CHP and DOJ personnel
- At various times managed DOJ's Latent Print, Questioned Document, Audio-Visual, Polygraph, Blood Alcohol, Instrument Repair, Toxicology, Quality Control, Grants and Forensic Technical Support Programs
- Instrumental in developing objective criteria for firearm and toolmark identification.

Futurelab

Martin looked over at his colleague, Anna, and told her that he was ready to flood the room with near infrared energy. The humidity in the room had been reduced to a level just above 1%. An ideal concentration for conducting their reconstruction test. They put on their thermal glasses, turned off all the lights, closed the drapes and activated the device. Soon, a low humming sound filled the room and then slowly, several remnant heat patterns began to form showing where the victim and suspect had struggled in the living room. The victim had been found face down near the hallway leading into the kitchen. But what transpired before that which eventually led to this homicide would now be revealed with this new crime lab tool. The real beauty of this test was that the residual heat patterns showed a variation in intensity so that it was possible to document the actual struggle. The more intense the pattern the more recent it was deposited. Science had indeed taken a big leap forward with this new investigative tool.

The special film that Anna was using would eventually end up at trial—if the case ever wound up in court. No more blood spatter interpretation, or reconstruction was necessary. No grilling on cross examination. It had become as easy as show and tell. After all, seeing was believing. Before we left, Anna had placed 26 radioisotope labeled organic strips around the room to collect blood stains. It had become so much easier that the conventional blood collection method they used in the last century. Each of these strips were automatically plotted using MGPS (Micro-Global Positioning Satellite) and gave a detailed map of each strips location. Crime scene investigation had become almost routine and a lot quicker taking about 45-60 minutes on average. With this information, it was almost impossible for a suspect to fabricate a story inconsistent with HIPD (heat intensity pattern determination). Cops really loved this technique because it eliminated the controversy of differing opinions that sometimes confused juries and cops alike. Another benefit of this technique was that the device illuminated all of the fingerprints.

Then it was just a matter of placing a special camera with a flexible fiber optic scope up against the print and click. Instant location, development and documentation. Heat was the new ally in the fight against crime.

Back at the lab we found the remaining staff criminalists, a medical examiner, a sociologist/profiler and a mathematician (a fractal expert) busy working on several homicide cases. Crime lab activity had become so specialized that only homicides and death investigation cases were ever sent to the crime lab. 80% of the crime lab budget was devoted to solving these types of cases. What happened to the other types of analyses usually conducted by the lab? With the passage of the Citizens Choice Bill by Congress in 2007, drug analysis had become a thing of the past. This bill allowed anyone to possess, sell, grow or manufacture the drug of their choice. In fact the government was now providing these drugs similar to the philosophy employed in the Netherlands. Except, our government was making money on the deal. Crime, particularly burglary and armed robbery had dramatically decreased but on the flip side we had a lot more people stoned on drugs. Raj, our resident philosopher said there's always a trade off when you change a law to affect human behavior. Even toxicology had been eliminated as a laboratory service. In an unprecedented act by Congress and ratified by all 52 states the law on drunk driving had changed dramatically. The legal blood alcohol level was set at zero! No alcohol what so ever would be tolerated from anyone driving a motor vehicle. No more trials. No more blood and urine alcohol analyses. If a person was found to have **any** alcohol in their system at the time of the offense, they were automatically guilty of driving under

the influence. SciTech Inc's new UVA Alcohol Discriminator Device only "saw" drinking alcohol. This device could also sense the presence of mouth alcohol and mouth sprays and differentiate it from the true blood alcohol concentration. Sentences were severe and first time offenders served 60 days in jail, had their vehicles confiscated and had a ComServ (community service) fine of 100 hours.



No more blood spatter interpretation, or reconstruction was necessary. No grilling on cross examination. It had become as easy as show and tell. After all, seeing was believing.

These changes had a dramatic impact on the modern crime laboratory. And with the introduction of email into the judicial system, all correspondence, including crime lab reports went directly to the chief of the county superior court system. Crime labs were no longer responsible to the district attorney's office as had been the practice for over 80 years. It was up to the district attorney to contact the appropriate superior court judge in order to obtain crime lab reports. These reports were equally available to the defense attorney representing the accused. Sometimes defense attorney's got these reports before the DA did. This new association provided just the right distance criminalists were looking for and it gave the crime lab personnel a greater level of credibility among lawyers, judges and cops. In fact, most courtroom testimony was taped prior to trial and the criminalist rarely left the lab except for going to crime scenes and training classes.

Does this seem far fetched? Too futuristic? Well, when I started my career 26 years ago I never used a gas chromatograph/mass spectrometer for either toxicology or for drug analysis. I couldn't begin to imagine routinely putting a small sample into a device and then have it compared with a huge library of drugs and print it out for me. I never used a SEM/EDAX. On any type of evidence, especially on gun shot residue cases. In fact, I never even used Atomic Absorption to conduct these tests. Never had an FTIR spectrometer. We had an IR but we had to clean up our samples in order to get a pretty decent graph of our drug or paint we were analyzing. I am amazed at what an FTIR can accomplish compared to the IR's I used to use. Never used an Alternate Light Source with a laser source to look for fibers at a crime scene or to illuminate fingerprints after using rhodamine-6-G. Never had a computer. Hard to believe it but I used a slide rule when I was doing blood alcohol calculations in court. Recently, I was showing my 32 year old sister-in-law my slide rule and she had no idea what it was. Even when I showed her how it worked, she said wouldn't a calculator be faster. Indeed. Forget about DNA. It was never even on the radar screen when I started. Now it's one of the greatest forensic tools of all time. Don't forget IBIS, ESDA and so forth and so on. When I look back on those early years, one of the words that leaps to mind is *primitive*. Yesterday's instruments are today's relics. Suitable for the Smithsonian. I never dreamed that forensic science and the tools we use would change our profession so dramatically. These tools and techniques have changed greatly over the years. And I believe they will continue to change as we continue to find new ways of doing things, new ways of locating things, new ways of interpreting things and new ways of presenting things in court.

The story above may indeed be farfetched. However, since I've seen so many changes over the years I keep wondering what's next on the horizon. No matter what skill, tool or technique the modern criminalist employs today, change will always await those who choose to look to the future. See you at the CAC seminar in San Diego.

* * *

The standing CAC Committees are:

Accreditation Liaison, AAFS Liaison, American Board of Criminalistics Liaison, Awards Committee, Board of Examiners, By-Laws Committee, CCI Advisory Committee, CDAA Forensic Science Committee Liaison, Certification Committee, DOHS Liaison, Endowment Committee, Ethics, Financial Review Committee, Public Relations Committee, Historical Committee, Merchandise Committee, Nominating Committee, Publications Committee, Seminar Committee, Training and Resources Committee, Founder's Lecture Committee.

* * *

Passages . . . **Michael J. Granado** of Riverside, CA passed away June 19, 1998 following a long battle with cancer. His wife wrote to say that Michael was very proud of his membership in the CAC.



From our readers . . .

Cover photo enjoyed

Editor:

Congratulations to you and to Art Director, John Houde, and to Edwin L. Jones, Jr, for an outstanding cover (the views of the same paint chip under different microscopic lighting conditions) on the Third Quarter 1998 issue of *The CACNews*. I was particularly intrigued by the last (bottom, right) view under co-axial illumination. Are those scratches and streaks on the paint chip itself, or are they an artifact produced by the co-axial illumination? Of course, these are photomicrographs of cross-sections showing the different layers, but I wondered if co-axial illumination might be useful for viewing the surface layer under a comparison microscope in order to see if it was at one time contiguous with another chip (on the other stage)? If those scratches and dust streaks really are on the surface of the chip and are especially rendered visible by co-axial illumination, then perhaps Edwin could come up with another intriguing cover!

Robert Blackledge

Jones explains

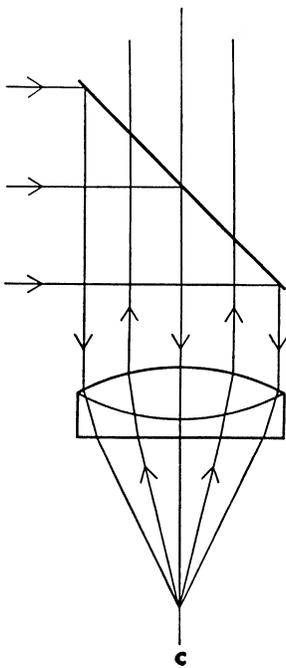
Editor:

I appreciated Mr. Blackledge's comments on my overlaid photomicrographs, featured on the cover of the previous *CACNews*. The paint chip was produced by hand polishing and therefore the random scratches visible with the coaxial illumination are real. If the paint sample had been prepared in a microtome all of the scratches would be in the

direction of the cutting blade. These same scratches are visible using oblique illumination or diffuse illumination. Fire-arms and toolmark examiners have been addressing the issue of matching fine surface scratches (striations) for more than 70 years. I found comparison microscopes back in the 1970's could be purchased with vertical illuminators for coaxial illumination. Historically, coaxial illumination using the objective as a condenser extends at least to the 1880's. The primary use for this type of microscopy is in the study of polished and etched metal samples. An illustration of matching abrasion marks on paint samples was published by Roger S. Green in Kirk's 1953 text, "Crime Investigation." Mr. Blackledge may be the first to recommend this type of comparison on the comparison microscope.

The paint sample was obtained from an autobody paint shop in Atlanta in the early 1970's. The paint guns were tested on a target before they were used to repaint the automobiles or parts. After several hundred layers of paint were accumulated, the stuff was chipped off and discarded. The mounted section of the paint chip photographed has more than 100 layers. The sample was prepared by using an X-acto razor saw and polishing the first surface with a fine grained sharpening stone. This polished surface was glued to the slide using Norland Optical Adhesive and a UV lamp to cure it. Any clear transparent glue will work. The thickness of the paint section was reduced using a coarse grained sharpening stone until some of the paint layers were able to

transmit light from the substage condenser. This sample was polished with the fine grained sharpening stone. No mounting media or coverslip was used. All of the photographs were taken with an Olympus NeoDPlan 10 objective with a numerical aperture of .25. The vertical illuminator was used to take the coaxial and the "epi illumination" photomicrographs. In researching my response to Mr. Blackledge's letter I discovered that epi illumination means lighted from above. The real name for this type of illumination is incident darkground or incident



Incident brightfield.
From Needham, "The Practical Use of the Microscope."

darkfield. A more technical name for coaxial illumination is incident brightfield. The transmitted light photomicrograph was taken using the substage illuminator and the transmitted with epi photomicrograph was taken with the substage illuminator and the vertical illuminator simultaneously. Paul Kirk in his classic textbook "Crime Investigation" recommends incident darkfield with the Ultrapak illuminator to examine paint layers. This type of illumination gives a color which most closely resembles the color observed with the naked eye under normal lighting conditions and can be used to observe a sample mounted under a coverglass. These two features make the incident darkfield illumination very desirable. This type of illumination is achieved by sending the light down the outer edges of the objective from the vertical illuminator through an annular lense which focuses the light on the subject which is then taken up through the normal focusing system. Incident darkfield illumination has been around since about 1928.

Edwin L. Jones, Jr.

Jobs *cont'd from page 5*

City of Omaha Seeks Criminalist.

Salary Range: \$36,061 to \$44,074 per year.

Requirements: Four years of experience in criminal investigation and identification and a HS diploma or equivalent.

Involves serving as a shift supervisor at the Omaha Police Dept Crime Lab; assigning and reviewing the work of subordinates; performing all phases of identification work; providing technical advice to subordinates performing crime scene investigations and specialty functions. In addition, involves testifying in court regarding evidence gathered. Criminalists report directly to the crime lab manager. For more info, see <http://www.ci.omaha.ne.us>, or contact: Jon Shanahan, City of Omaha Employment Div., Omaha/Douglas Civic Center, 1819 Farnam St. Suite 506, Omaha, NE 68183.

Oakland PD Announces Opening

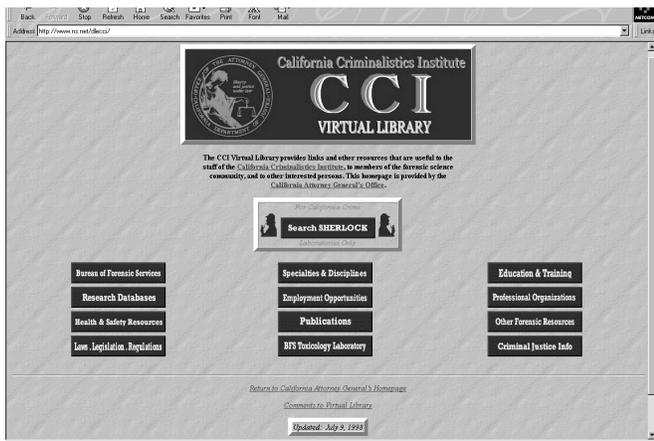
Criminalist III (DNA Technical Lead)

Salary: \$5,297 - \$6,503 per month

The Oakland Police Department Criminalistics Laboratory uses amplification based markers. For this position, an advanced degree, specific course work, and forensic DNA experience requirements will apply. Interested candidates should contact Mary Gibbons at (510) 238-3386 or fax your resume to (510) 238-6555, requesting an announcement. The application period closes Sept. 8, 1998, but may be extended depending on the number of responses received.

"SHERLOCK" Web Access to CCI Library Citations Announced

Since November 1987, the California Criminalistics Institute (CCI) Library has been serving publicly funded crime laboratories (state, county, city, federal) and coroners / medical examiners located in California. Its collection includes approximately 2,000 circulating items (books, reports, videos) and subscriptions to more than 60 periodicals. From these holdings,



<http://www.ns.net/dlecci/>

the Library staff has developed a database containing citations for more than 15,000+ items (2,000 books, 200 videos, and 13,000 journal articles). We have recently made this database searchable via the World Wide Web. We have named this new portion of our website SHERLOCK, after Sir Arthur Conan Doyle's legendary character. We believe that, in our day, Watson would also often find that Holmes had been perusing the Web. In his honor, our website features a Sherlock Holmes quote of the month. The CCI Library staff would like to formally introduce our SHERLOCK criminalistics citation search to the CAC membership. The SHERLOCK website, compatible with either the Microsoft Internet Explorer or the Netscape browser, can be accessed at no cost, from work or from home, 24 hours a day. Its two search engines (one operates via a basic CGI search and the other is a multifield JAVA enhanced version) are fast, modern, and easy-to-use. The citations may be searched by Title, Author, Periodical, Year, and Subject. Brief online instructions, library service policies, and online forms to request library materials are included. Though portions of the CCI Virtual Library website (<http://www.ns.net/dlecci/>), which includes useful information and relevant links, are available to the general public, the SHERLOCK portion is a secure, private area protected by password. All interested CAC members, including those working in the private sector, may now request access to SHERLOCK to search its citations. However, we will continue our longstanding policy of sending the hard-copy of items cited therein only to forensic scientists and other adjunct professionals working in the public sector in California. If you have any questions or would like to arrange for SHERLOCK access, contact CCI Library staff via phone (916) 227-3575, fax (916) 454-5433, email [dlecci@ns.net], or U.S. mail to CCI Library, California Dept of Justice, 4949 Broadway, Rm A107, Sacramento, CA, 95820.

Submitted by Ray Silvia and Josh Spatola, CCI Library

Interested in becoming a member?

- Receive the *Journal of the Forensic Science Society* and/or *Journal of Forensic Sciences*—
- Receive *The CAC News*—
- Lower, Member registration fees at CAC Seminars —
- Receive CAC Membership Roster / Seminar Abstracts —
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To join, follow these simple steps: 1. Contact the CAC Membership Secretary, Pennie Laferty (714)834-4510, to obtain an information packet and application. 2. Fill out and return the application to Pennie along with your first year's dues & appl. fee. 3. Two of your listed references will be contacted. 4. Applicants are screened to ensure that they meet the requirements. (Outlined in Article 11 of the CAC Membership Handbook). 5. Your application will be presented to the Board of Directors at their next quarterly meeting. If approved, your application will be voted on by the membership at the next Seminar.



The world of forensic science is rapidly changing—stay in touch by subscribing to the "Forensic Listserv." Completely free, this message board is always buzzing with hot topics about certification, use of canine detection methods, DNA technical questions, crime scene processing methods and even requests from TV producers for broadcast ideas.

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Quality Assured

Informal Opinions: A Thing of The Past?

Scenario: A detective walks into one of the lab units with an item of evidence on a case. He asks someone to take a look because he needs some information for an investigative lead. The evidence might be narcotics, or trace evidence, or it might be a missile from an unidentified firearm. An analyst looks at it and renders an opinion. The detective gets his information and disappears. No paper. No notes. No trail. No documentation. And why not? What's the big deal? In the old days, this was routine. But that was then. This is now. Our standards and expectations have changed. The scenario today goes like this: A detective hands evidence to an analyst and asks for an opinion. If the detective leaves the room, the chain of custody has been affected and this must be documented. But if the detective remains in the room with the evidence, the chain of custody is unaffected. The analyst examines the evidence. It might be a simple visual examination or it might include a microscopic examination or a chemical test. In any case, the analyst performs an examination on case evidence and draws a conclusion from that examination. Current standards require some level of documentation. It might be handwritten notes, or a quick fill in the blank form. Something needs to be put to paper that can be associated with that case and traceability of that opinion given to the detective has been established. Such are the new standards of accreditation and expectations of quality assurance. Is this an easier format? Does this perhaps discourage a detective from seeking a quick opinion or discourage an analyst from rendering an informal opinion? It very well might. Is it a better process? When an analyst takes evidence in a case, they have inserted themselves into that case. In rendering an opinion based on their examination they may have very well caused something to happen, such as the issuance of a search or arrest warrant. They may have caused a change in the direction of an investigation. In looking at this process, it is inconceivable that documentation would NOT be done. Several key concepts are at issue:

1) This is casework, and casework examinations must be appropriately documented. 2) A conclusion was drawn and communicated. That conclusion must be documented. 3) This process is subject to discovery. Without proper documentation,

the proper trail cannot be established. 4) The very nature of quality assurance requires documentation for traceability and accountability.

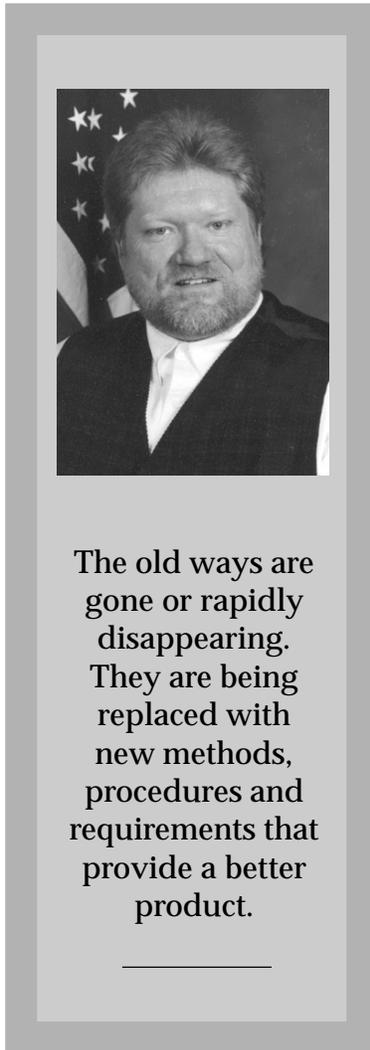
SURVEY GROUP OPINIONS

Our Southern California QA programs all have essentially the same viewpoint:

"I hope we have moved beyond quickie verbal opinions." Frank Fitzpatrick, Orange County. "If it is not documented, it did not happen. There should be notes..." Jim White, QA Manager, "We are...more formal...more restrictive..." "Document!" LAPD Quality System. "They (informal opinions) are dead....we even document casework conversations." Steve Secofsky, DOJ Quality System. "Even preliminary opinions have to be written and peer reviewed." Kevin Jones, Washington State Quality System. "Any evidence examination will be documented with, at the very least, notes in the case packet." Heidi Robbins, LASO.

One opinion took a slightly more liberal viewpoint: "If, by an "informal" opinion, you mean one that is not committed in writing, then I see no problem with that." Peter Barnett, Private System.

The bottom line for the industry standard can best be paraphrased as follows: the old days are gone. The old ways are gone or rapidly disappearing. They are being replaced with new methods, procedures, and requirements that provide a better product to the criminal justice system. It may surprise you to consider that the answer to the question as to whether or not informal opinions are a thing of the past, might be best found in the following opinion from Pete DeForest: "Well-considered informal, or quick opinions, which are labeled and documented as such, are essential." Notice the words used: labeled, documented. No, the informal opinion is NOT a thing of the past. It is, and should be, very much alive if Criminalistics is to "...fulfill its role in providing investigative leads..." (Pete DeForest). What is different is it's form. Today's informal opinion has a different face that is much more sharply defined and has a new strength of character achieved through the requirements of accreditation standards and quality assurance—*documentation*.



The old ways are gone or rapidly disappearing. They are being replaced with new methods, procedures and requirements that provide a better product.

John Simms

Are you ready for the next century?

The ninety-third semiannual spring seminar of the California Association of Criminalists is scheduled for 1999 in Oakland at the Oakland Marriott City Center Hotel. The event is planned for May 11th through the 14th and will be hosted by Forensic Science Associates of Richmond. The theme for this meeting is "Quality Assurance—The Role of Disclosure and Peer Review." Special workshops are planned, including: DNA, Managing Difficult People and QA in Forensic Investigations. In addition, there will be technical presentations and the Founder's Lecture. This will be an informative and interactive seminar. For more info: Peter Barnett, Seminar Chair, Forensic Science Associates, 3053 Research Drive, Richmond, CA 94806, (510) 222-8883, (510) 222-8887FAX, pbarnett@crl.com

The hotel is located in the heart of downtown Oakland, adjacent to the Oakland Convention Center, and close proximity to many downtown businesses. Easy access to both OAK and SFO airports. 21 floors, 479 rooms, 15 suites • 5 meeting rooms; 89,000 sq. ft. total meeting space • Restaurant (open breakfast, lunch, dinner) • Room service • Laundry valet • Shoe shine • Concierge services

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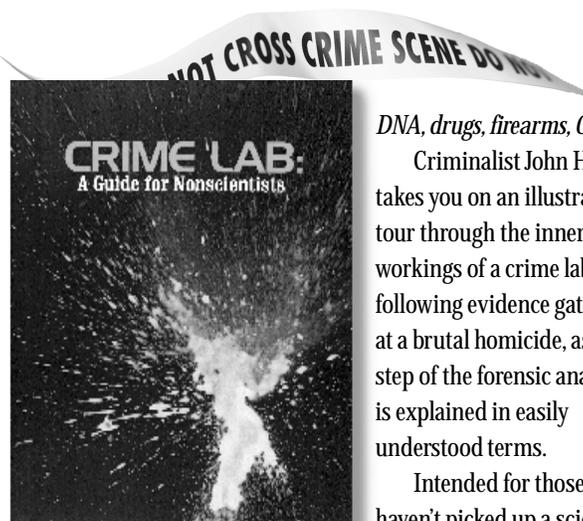
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Author, *The Forensic Science Handbook*



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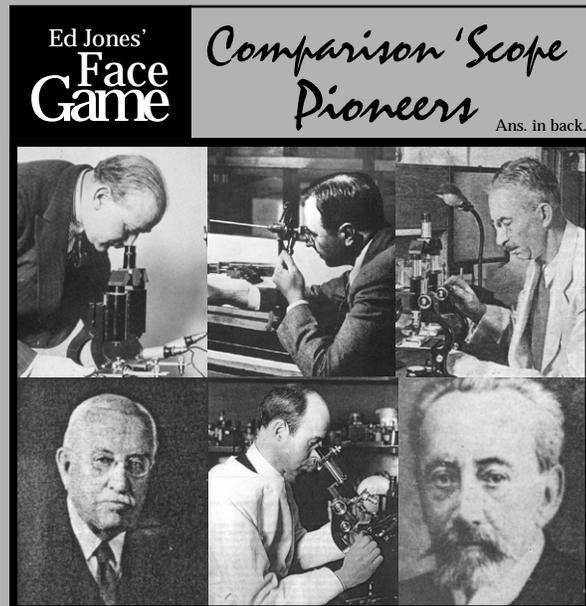
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Pitfalls in Bloodstain Pattern Interpretation

W. Jerry Chisum¹

Bloodstain patterns are some of the more useful tools of the crime scene reconstructionist. I have found that some “experts” make a lot of errors in the interpretation of this evidence. If not corrected, the value of this evidence may be “legally lessened.” These errors essentially fall into four categories: 1. Mind set; 2. Assuming that all is as it was; 3. Mathematics; 4. Lack of background information.

Mind set

The investigator, whether criminalist, detective, evidence technician, or a witness having other rationalized explanations, enters into the scene with certain expectations. We expect things to happen in a certain way due to our past experiences and our own ignorance.

When we respond to a crime scene, we are told certain facts or given some information regarding the type of case. As we drive we think about past cases of this type we have encountered. We think we know what to expect. We may plan to proceed with this case as we did in other cases when we were successful. We start to make assumptions.

For example, figure 1 is a bar with a man lying in a pool of blood. He has been stabbed in the torso 29 times. The only blood not in the immediate area of the body is the 3 very small drops in the back corner. The importance of these dried stains can not be determined without serological analysis as there have been other fights in this bar before.

The descending aorta is cut and there are several punctures in the heart and even more in the lungs. Based on

the bloodstain patterns and the injuries, we would expect the stabbing to have occurred while the man was seated on the barstool or standing next to it.

There was a hidden video camera recording the barmaid, as the owner was suspicious of her not ringing up all sales. The camera recorded the fight that occurred. The 29 stab wounds took 14 seconds. The first stab wound was delivered approximately where the man’s feet are now located. He retreated, while being repeatedly stabbed, towards the bathroom then turned and back into the far corner. He fell to the ground; the assailant lifted the victim’s left arm and stabbed him under the arm several more times. The assailant walked away from the victim along the wall. He was carrying his Buck knife. He proceeded between the pool tables folding and putting his knife away. He spoke to the barmaid, who was on the telephone to the police then left the range of the camera.

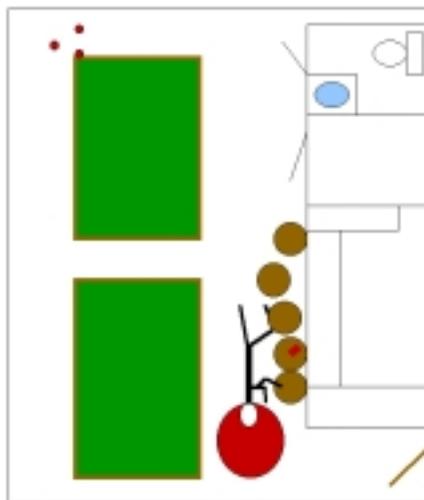


Fig. 1.

The victim got to his feet and walked to the middle barstool. No blood showed on his shirt. He sat on the stool with his head on the bar for a few seconds then fell to the floor. The total time from the first stab wound to falling was 35 seconds.

Without the videotape we would have difficulty believing the witnesses. (Before they knew about the video, they a) denied being there; b) were in the bathroom at the time.) We expect to see a blood trail over the route the victim and assailant took; or, at a minimum, a trail from the corner to the barstool. No such trail existed. This case makes us realize that we have preconceived ideas that influence what we recognize as physical evidence. We need to eliminate preconceptions and realize that the evidence may not show everything.

The original information may have come from the dispatcher. The approach or mindset we have is influenced by the information from the dispatcher that “we have a suicide” as opposed to “we have a suspicious death” when the original call is made. The dispatcher may only be giving you the information relayed by the original caller—perhaps the suspect, who has staged the scene. Hans Gross expressed these thoughts in his book on criminal investigation in 1893. So this is nothing new.

Sherlock Holmes said,

“It is a capital mistake to theorize before you have all the evidence. It biases the judgment.”
“It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts.”

This may seem a good approach to eliminate the problems of mind set. However, you cannot recognize what is evidence until you have formed some theory. You need to work to prove that theory wrong, until you can no longer disprove a set of alternative theories

¹Program Manager, California Criminalistics Institute, 4949 Broadway, Room A104, Sacramento, CA 95820

Co-winner of Most Outstanding Presentation, California Association of Criminalists semiannual seminar, Monterey, May 8, 1998.

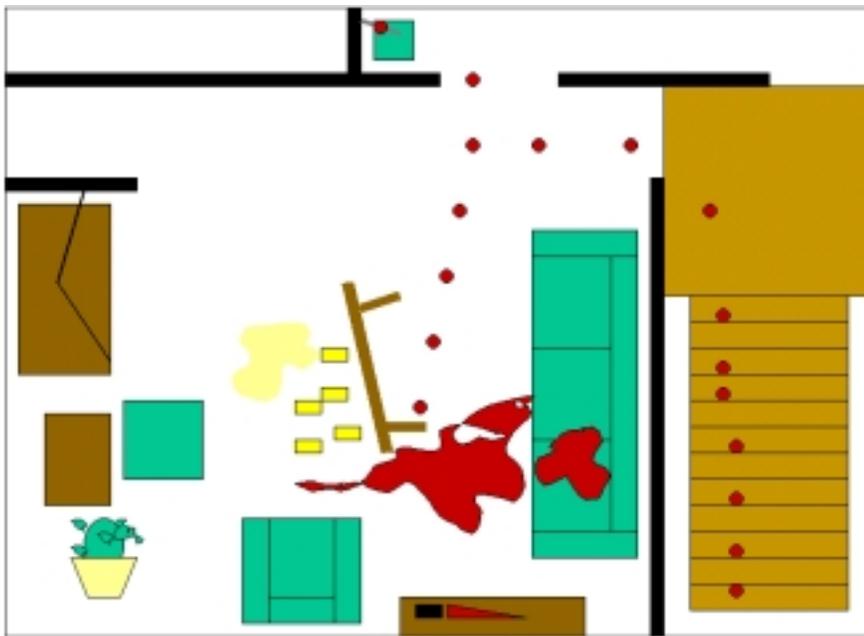
without further work. Or as Sherlock stated,

“That process starts upon the supposition that when you have eliminated all which is impossible, then whatever remains, however improbable, must be the truth. It may well be that several explanations remain, in which case one tries test after test until one or other of them has a convincing amount of support.”

interpretation based on the bloodstains. What should change? The facts or the theory?

We assume all is the same

When we respond to the crime scene we must realize that we are not the first persons there. Things are not always as they were when the incident occurred. If we make that assumption we are going to misinterpret the scene. We must realize that the suspect, victim, or witnesses may move themselves or objects in the scene after the incident. These movements may change the patterns.



Another failing that “bloodstain experts” have is that they only see the bloodstains ignoring the remainder of the evidence. One can only wonder when one reads some of the case descriptions in some of the books on the subject and the photographs show other evidence that disproves the stated interpretation! Those “experts” called only to look at the stains, only look at the stains. We must consider all the evidence at the scene. We should ask ourselves what other information is present that helps reconstruct the incident. Each observation must be studied questioned, does it support or refute the in-

We must also account for the three phases of emergency response. Before we arrive at the scene, there are people who enter the crime scene and alter, destroy and create physical evidence—and we pay them to do it!

The first response is for Public Safety. The first officer responds to the crime scene and has as primary duties the protection of life and the apprehension of the suspect. Hopefully, the officer will search the scene for the suspect.¹ When he does he will not be using gloves to protect the scene from fingerprints, or booties to protect from footprints. If he steps in blood and

makes a false trail, too bad, he is doing his job. Physical evidence is not a high priority until the scene is secure.

The second phase is the life saving efforts. The Emergency Medical Teams (EMT) or paramedics that arrive at the scene are there to try to save the *patient*. They are not there to preserve evidence. They may roll the body over, move it, move evidence, and cut the clothing through the previous cuts or holes made in the assault. While we ask them to try to not make our job harder, we have to understand their duty as well. Asking them to draw a chalk outline around the body, as it was when they arrived is futile. The chalk outline may only take 5 seconds, but, maybe, that 5 seconds means the difference between life and death. We can not fault them for doing their job.

The third phase is the investigative phase. This is when we expect the scene to be protected with only limited access. We expect the evidence to be preserved, and protected from contamination, loss, change, etc. But is it? The crime scene tape is up, is it respected? Do we maintain control over all the items?² When we collect the items of evidence do we preserve the “best evidence?”

We are called to the scene of a stabbing in a second floor apartment. As we arrive we see acceleration skid marks in the sand on the asphalt parking area in front. Leading these skid marks is a trail of blood drops. We look at the stairs and see not only the trail but also footprints in blood coming from the apartment on the left. The TV is on, the blood trail splits near the door, one going into the kitchen on the right, the other to the living room on our left. The coffee table is overturned, spilling the beer cans and the beer. The lamp in the corner has been broken. There is a pool of blood on the couch and a larger pool between the couch and the overturned coffee table. There are spurts of blood coming from this pool. There is a bloody knife on the bookcase at the end of the couch.

How long will it take us to work this crime scene? How do we document the signs of violence?

Before we start extensive docu-

mentation, gridding the stains, collecting evidence we should find out more about the actions of the people that have been at the scene. The first officer stated that when he entered the apartment he saw a man on the couch with a knife in him. He proceeded to the bedrooms to see if the perpetrator was still in the residence. When he came out the paramedics were there so he went down stairs to await the detectives.

What did the paramedics do? One of them stated that when they entered the man was on the couch. They cannot render CPR on a soft surface so they had to put him on the floor. The coffee table was in the way and it couldn't be moved because of the ottoman. He kicked the ottoman into the table upsetting the lamp, which fell and broke. They then pushed the coffee table, but it overturned spilling the beer cans, one of which was full. When they lifted the patient and placed him on the floor the knife came out. Rather than risk kneeling on it he placed it on the bookcase. As they applied CPR blood came out of the wound and onto his arm above his glove. Leaving his partner, he rushed into the kitchen to rinse off the blood.

The blood trail and footprints? As they carried the gurney downstairs, blood dripped off the lower end and the EMT on the upper end stepped into it. They loaded the patient into the ambulance and sped away.

Before we start to work at a crime scene or to examine bloodstain patterns, we need to obtain information about what was done by those who have been at the scene prior to our viewing it.

Do we destroy physical evidence by our actions or inaction at the scene?

Do we lose the trace evidence and stain patterns on clothing of the victim by not removing it prior to the body being moved? If it is not collected at the scene but is the body left for examination at the morgue we will lose information that may be critical to the investigation.

The bloodstains on the clothing may also be important for reconstruction of the incident. Which direction does the blood flow? Is there a change

in the pattern? Was there a time when the individual was standing and bleeding? When the body is loaded into the body bag all this evidence is lost. Document the evidence at the scene and, if possible, also properly remove and package the victim's clothing for the best evidence.

Mathematics

Mathematics is used in calculating the origin of blood drops. There is a basic premise that a blood drop is a perfect sphere. When it strikes a surface the pattern it leaves is an ellipse. The shape of the ellipse is dependent upon the angle the blood hits the surface. These premises involve physics and some higher mathematics. However, the bloodstain analysis schools seldom deal with more than giving the student the formula for calculating the angle of impact. This angle (α) is given by

$$\text{arc cosine (width/length)} = \alpha$$

However, some of the people claiming bloodstain expertise because they have taken a course and done a lot of blood dropping experiments do not have a good understanding of the mathematics they are using. They don't know basic trigonometry. They haven't a clue as to what sine, cosine, tangent, etc. mean. Yet they use the formula they were taught at their class. They know that if they plug the measurements into the calculator and use the proper function they will get an answer. These "experts" are recognized in the courts and are testifying on bloodstain interpretations.

The idea of significant figures is never mentioned. In measurement science we know that we can not have a calculated value that has more significant figures than the lowest measure-

ment. The drop measuring 0.5 cm by 0.35 cm does not have an angle of impact of 69.54268489° just because that is what the calculator shows. We can, with these measurements, use 1 significant figure or 70°. This would be true for any value over 65.0°.

The concepts of precision and accuracy in measurements are also foreign to many "experts." One of these "experts" wrote a report which stated; "the drop was .05 x .065 mm." This measurement was done with a hand lens. No one questioned the accuracy of these measurements. The tool being used had 0.1 mm increments not 0.01.

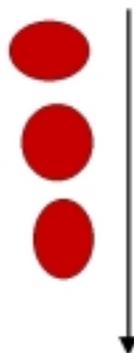
The basic assumption that the drop is a perfect sphere is not true. There is a certain amount of oscillation in the falling drop. This oscillation is quite obvious in the slow motion videos mentioned earlier. It appears to be caused by the stretching of the drop before it falls and the surface tension pulling the drop into a sphere. It stabilizes in a few feet, but may have considerable affect on the calculations of impact angles.

One of the ways to locate and illustrate the point of origin based on measurement of the drops is to attach strings to the surface. These strings are aligned along the angles of impact. The point of origin where the strings all cross. This method ignores the effects of gravity and air resistance on the drops. Therefore, this should never be more than a first approximation.

We assume that blood spatters originate from a point source. We string the drops back along straight lines to a "point of origin." Slow motion studies do not support the concept that blood originates from a point. These studies also show that blood does not always fly straight away from the tool edge. We need to realize these facts and not force a point of origin, but settle for an area of origin. This area can be estimated with a laser pointer as well as anything except the more sophisticated computer programs.

Background knowledge

So many factors effect blood flow that it is mandatory we have some background information prior to trying



to interpret the stains. We should try to learn what we can about the wounds, instruments, scene, stains, and the participants.

There is a belief by some experts that they can tell the difference in types of injuries by examination of the stains. They claim to be able to tell arterial spurting from cast off or other types of deposited stains. This makes certain assumptions regarding the drops that do not always hold true.³

We can't count the blood streaks in a beating; add one and state the number of blows. Blood is only spattered or cast off when it is already present on the surface. If we know the number of blows and, if possible, the order, then the actions in the beating that produced the stains can be described with a higher level of confidence.

The involuntary responses of the body cause different blood flows. By knowing the injuries we can see why there is more or less blood at the scene. In the bar scene, knowing that the wounds were plugged by fatty tissue would explain why there is no blood. Arterial wounds can cause the blood pressure to rise; a cut jugular vein may "suck" air into the heart causing death by embolism.

A streak of blood caused by a moving hand trying to ward off a blow may appear quite similar to the streak caused by some tools. We should always try to determine the size and shape of the instrument involved in the case.

In the bar scene described above there had been previous fights. The blood in the corner was ignored as it was assumed to have been from one of those incidents. We can save ourselves a great deal of work if we learn the history of the location regarding bloodshedding events.

If we try to work a crime scene from photographs, we are at a disadvantage. The size and shape of the room are difficult to visualize. The range of motions allowed for the suspect and victim may be limited. The areas of shadowing due to furniture or other articles do not show in photographs. We should visit the scene if possible; if

not, then we should get as much information about the scene as we can.

Bloodstain experts usually assume that all blood at the scene is from the victim. However, this is not always true, many times the suspect is bleeding also. Interpretation of the patterns may require serological tests to determine whose blood we are examining.

The health, age, background, and personality of the victim determine how they will react to an attack. A person taking coumarin, heparin, or even aspirin will bleed more, as they don't clot. A person taking large doses of vitamin E will clot faster. The person with a background in the martial arts will react differently than a person without this training. We need to learn at least some basic facts about the victim when we look at the crime.

To obtain information about all five of these subjects would be ideal. If we can not learn about one then we are somewhat handicapped. If we can't gain information about two then we should be cautious about our statements. If we can't learn about three of these subjects then we should refuse to proceed with any interpretation.

How to avoid the pits

If we want to continue to have bloodstain pattern interpretation recognized by the courts as legitimate evidence, then we must strive to avoid the pitfalls. We need to find those that are falling and either educate them or keep them from the field. They are doing a disservice to justice.

To keep ourselves out of the pits we need to learn as much as we can about bloodstains. We need to gain as much background information as pos-

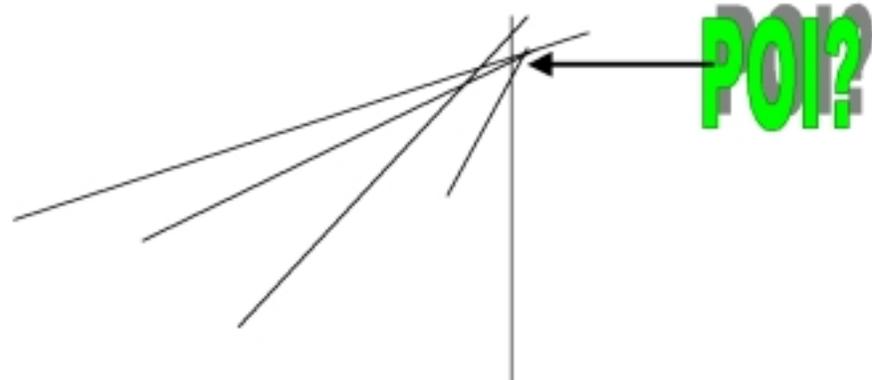
sible about each case. We can't make assumptions, we form theories from facts and we use a holistic approach ignoring nothing. Finally, we need to work as a team with the investigator, the evidence technician, the prosecutor, or the defense attorney and his investigator. Listen to the ideas, but base your findings solely on the evidence.

Footnotes:

¹ One of the female criminalists in one of our classes related that while at a shooting scene she had gone into the bedroom and opened the closet door. The armed suspect knocked her down and fled. Other officers at the scene apprehended him. The first officer had not looked in the closet!

² In a recent investigation, the officer guarding the scene stated that no one had entered the scene during the time he was on duty. He further stated that he had not touched any of the evidence. Upon questioning, he admitted that the ID officer had entered the scene *twice* and was accompanied the first time by two unknown individuals. Further, when asked who found a .380 casing he stated he did. How did he know it was a .380 and not a 9mm, "he read it on the base."

³ I was asked to look at a crime scene by another criminalist. He told me that there was a lot of arterial spurting on the walls and this really complicated the scene. I asked how he knew the stains were arterial. He replied that he had taken a course in which the appearance of arterial spurting was emphasized. I asked him if the autopsy had been performed. He replied that it had; we contacted the pathologist and asked about the injuries. The Doctor stated that no arteries or major veins had been cut!



Application of Fourier Transform Near Infrared Reflectance Spectroscopy in Forensic Science

Robert D. Blackledge¹

ABSTRACT: During the month of November 1997 the Perkin-Elmer Corporation (Norwalk, CT) loaned to the Naval Criminal Investigative Service Regional Forensic Laboratory, San Diego, a demonstration model of their Paragon IdentiCheck FT-NIR Spectrometer fitted with the IdentiCheck Reflectance Accessory (ICRA). Samples examined included chemical and controlled substance standards, samples of pure heroin and heroin cut with 10% lactose (pillfering simulation), white paper samples from numerous sources, photocopy paper and photocopied pages, genuine and counterfeit U.S. \$20 bills, soil samples, and different brands of duct tape. Comparison of a spectrum against another spectrum or against all those entered into a library was accomplished using the COMPARE command. COMPARE (a patented algorithm) minimizes the features of the spectrum caused by the method of collection, and maximizes the differences caused by contaminants or adulterants. Additionally, the heroin sample files (cut and uncut) and the \$20 files (genuine and counterfeit) were examined by a chemometric approach known as SIMCA (Soft Independent Modeling by Class Analogy) to see if the different sample types could be grouped. Based on these preliminary tests, FT-NIR reflectance analysis would appear to be an excellent method for the comparison (same/different?, common origin?, adulterated?) of samples. The method is rapid, requires no or minimal sample preparation, and using developed macros the instrument may be operated by non-technical personnel with minimal training. This report provides the details of these sample trials and suggests other forensic sample types that may be amenable to FT-NIR reflectance analysis comparisons.

INTRODUCTION:

Although near infrared reflectance analysis has been routinely used for decades in commerce, its use by the forensic science community has been quite limited.^{5,8,9} During the month of November 1997 the San Diego Regional Laboratory of the Naval Criminal Investigative Service (NCISRFL) had the opportunity to test numerous sample types with a Fourier transform near infrared (FT-NIR) reflectance spectroscopy system which was on loan from the Perkin-Elmer Corporation, Norwalk, CT. Trial conditions and results, briefly by sample type follow. Instrument Conditions. Spectra were recorded on a Perkin-Elmer Paragon IdentiCheck FT-NIR Spectrometer fitted with the IdentiCheck Reflectance Accessory (ICRA). All spectra were 16 co-added scans recorded from 8,000 to 3,600 cm^{-1} at 4 cm^{-1} resolution. Spectra

were normalized using an absorbance-expansion (abex) data-processing routine prior to their entry into a library. Spectra were ratioed against a background obtained by placing a Spectralon disk over the upper sample beam. Each day, prior to obtaining any spectra, instrument performance was checked by a validation routine that uses an internal reference material to check wavelength accuracy, ordinate values, and noise levels.

Chemical and Controlled Substance Standards. Good laboratory practice requires the validation of chemical and controlled substance standards prior to their initial use.⁶ However, the validation of additional bottles of the same lot, or of new lots from the same company, is unnecessarily time consuming, tedious, and costly. Test were performed to see if FT-NIR reflectance

spectroscopy might be able to quickly show that the contents of additional bottles or new lots was substantially the same. Samples were placed neat into 10 mL glass beakers and the beakers placed over the exterior sample position of the ICRA. (Glass sample holders do not interfere in the near infrared.) A Y-shaped magnetic holder was used to insure the consistent positioning of the beakers. A total of 57 commercial drug and chemical standards were examined and their spectra were entered into a library. Repeat examinations (after redistributing the sample in the beaker) followed by execution of COMPARE, identified the correct sample as the first hit in every case and the correlation values for subsequent hits were much lower. Low correlation values obtained upon execution of COMPARE for the spectrum of a substance not yet entered into the library showed that a false identification was unlikely. Illustrated below are the results



Perkin-Elmer Paragon IdentiCheck FT-NIR Spectrometer with ICRA

for COMPARE of a secobarbital spectrum when secobarbital was not yet included in the library, and then after it had been entered into the library, the sample redistributed in the beaker, scanned again, and COMPARE again executed.

Paper Comparisons. A ransom note and paper found in a suspect's home, a note given by a robber to a bank teller and paper found in the suspect's car, could pages have been removed and substituted from a will (or other legal document)? These are just a few examples where FT-NIR reflectance spectroscopy might be used to quickly and easily screen paper samples for possible



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commonality of origin. A library of FT-NIR reflectance spectra from sixty-eight (68) white paper samples that had been used in a previous study² was created. Comparison of other areas on a given sheet showed great uniformity across a page, and most pages from different sources were easily distinguished. Differences were also seen with photocopy paper before and after photocopying, and between the two sides of a page that has been photocopied on only one side. Although more testing is needed, these comparisons show great promise. For several years now the paper industry worldwide has been changing from a manufacturing process that left paper with a residual acidity to one ranging from neutral to slightly alkaline.² Now

it is quick and nondestructive, FT-NIR reflectance spectroscopy could be a valuable preliminary screening technique in duct tape comparisons. Future work will consider whether this technique may be capable of distinguishing different lot numbers of the same brand.

Soil Comparison. The training required before one is qualified in forensic soil comparison is lengthy, and the comparisons themselves are time consuming and often quite subjective⁴. Although not intended to supplant existing soil comparison methods, could FT-NIR reflectance spectroscopy provide a screening procedure that in addition to being quick and easy would also provide data suitable for objective

examinations of the same overall sample but each time emptying out the cup and refilling it with new material. Time and equipment (no sieves or muffle furnace were available) did not permit a through study of this evidence class, but the limited results show promise and additional work is planned.

Pilfering Simulation. As a check on both quality control and employee honesty, on a random basis a certain percentage of previously-analyzed contraband held in evidence storage should be reanalyzed by a different chemist prior to its court-authorized destruction. A weight check and a qualitative analysis would not be sufficient since a clever thief might just remove a portion of the original sample and replace what had been removed with a similar-appearing cheap powder. If an FT-NIR reflectance spectrum of the sample had been obtained and saved upon initial analysis (electronic signature programs can prevent the deletion or alteration of the data^{1,3}), could a subsequent FT-NIR reflectance analysis (using a macro that includes COMPARE and quickly provides a simple PASS/FAIL answer) detect any pilfering? Ten spectra of a heroin sample (>90% pure) were obtained and each saved as files. Ten percent by weight of the heroin was then removed and replaced with an equal weight of lactose. Ten spectra of this adulterated heroin (each time redistributing the material in the beaker before recording the next spectrum) were then obtained and saved as files. Although the COMPARE function clearly distinguished the spectra, a chemometric approach known as SIMCA (Soft Independent Modeling by Class Analogy) was used in an attempt to group the data. Details of the SIMCA approach will be discussed elsewhere,⁷ but the figure be-

COMPARE library search results on secobarbital:

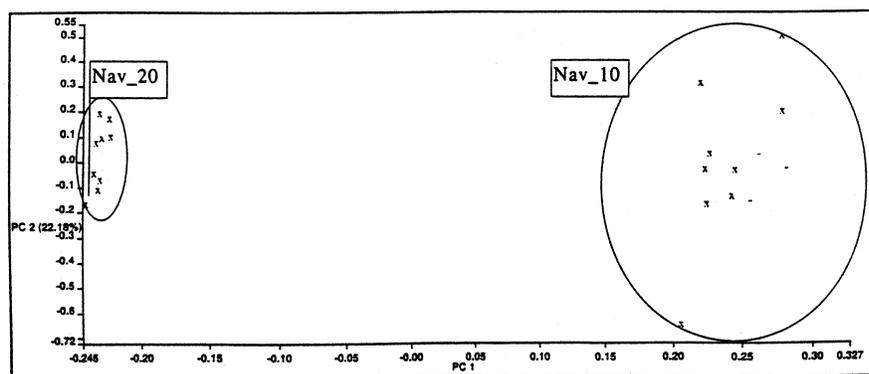
BEFORE LIBRARY ENTRY		AFTER LIBRARY ENTRY	
Correlation	Name	Correlation	Name
0.540391	AMOBARBITAL	0.999963	SECOBARBITAL
0.489232	BUTABARBITAL	0.538178	AMOBARBITAL
0.487553	PENTOBARBITAL	0.487383	BUTABARBITAL

[A Correlation value of 1.000000 would be a perfect match.]

because of additional environmental concerns, the paper industry is investigating bleaching methods that would not require the use of chlorine-containing chemicals. During this period of change it might be possible to date paper in a manner analogous to ink dating, i.e.—a document might be shown to be fraudulent because the paper manufacturing process used did not exist at the alleged time of creation of the document.

Duct Tape Comparisons. Duct tape is frequently used in the commission of crimes. Although fingerprints or an edge match may associate suspect(s) with the crime, this is not always possible. Can FT-NIR reflectance spectroscopy be used to quickly compare dust tape samples? The following gray duct tape samples were examined: Manco Duckp, All Purpose, 2 inch and 1.88 inch widths; Scotch 3M, All Weather, 48 mm width; Nashua 357, 2 inch width; and Tesa 4848, 4 inch width. Tape samples were placed flat over the upper sample window of the ICRA. Spectra of both the cloth side and the adhesive side were obtained and the files entered into a library. Different samples could be distinguished using COMPARE. Because

analysis? In a limited geographical area would it be possible to create an FT-NIR reflectance library of the various soil types? A limited sampling of 18 soil samples collected from an area just west of Los Angeles, California, was examined using sample cups placed in the bottom section of the ICRA. When filled and level a sample cup held roughly 0.7g of soil. Other than mild grinding in a porcelain mortar to break up clods, the samples were examined as is. For a given sample, FT-NIR reflectance showed good uniformity upon repeated



Pilfering Detection: Nav_20 = uncut heroin Nav_10 = heroin with 10% lactose

low shows that the two groups were easily separated, and therefore pilfering would have been detected.

Counterfeit Currency. Can FT-NIR reflectance spectroscopy quickly detect counterfeit U.S. currency? This might be expected since a special paper is used for U.S. currency. Ten counterfeit U.S. twenty dollar bills (from an assortment of cases) were obtained from U.S. Secret Service. Ten genuine \$20s were used for comparison purposes (all had been in circulation). For examination each bill was simply placed over the upper sample beam position of the ICRA and held down flat with the Y-shaped magnetic bar. A SIMCA analysis of the data clearly separated the two groups. Surprisingly, the counterfeit bills had the tightest grouping. This may mean that the papers used by different color copy machines are quite similar although quite different from the paper used in genuine U.S. currency.

Additional Possibilities. Although as yet not tested, the following are additional forensic science evidence types that may be amenable to FT-NIR reflectance spectroscopy comparisons:

Are the contents of numerous visually-similar packages all the same? Frequently cases involving the seizure of suspected contraband consist of numerous similarly-appearing packages all containing visually-similar powders (example -numerous kilo "bricks" of cocaine). Because Federal (and some state) sentencing guidelines are related to the total quantity of the specific controlled substance recovered, it may not be sufficient to positively identify the drug present in just a few packages. FT-NIR reflectance spectroscopy can quickly demonstrate that the powders in all the packages are the same. FT-NIR reflectance instrumentation can even be equipped with a robust handheld probe. Thus, the "bricks" could be slit open, the probe inserted, and the FT-NIR reflectance spectrum of the powder rapidly obtained.

Did two or more drug samples originate from a common source? Are drug samples obtained from various individuals at various locations all originating from the same common source? In drug overdose cases resulting in death, can the remaining unused heroin, cocaine, "China White", etc., be compared with that in the possession of the alleged pusher? FT-NIR reflectance might be able to quickly give a "yes" or "no" an-

swer. With a "yes" answer you would then need to do more extensive (and time consuming) comparative tests, but when the answer was "no" you could stop right there and have saved a lot of time.

Methamphetamine and amphetamine synthesis routes. With methamphetamine and amphetamine produced in a clandestine laboratory, you would expect to see batch-to-batch variations even if the same synthesis method was used in every batch. However, because of unreacted starting materials and reaction byproducts it is possible that certain portions of the NIR spectrum will be characteristic of the synthesis route used. This information could have intelligence value since it would tell agents which chemicals, solvents, catalysts, and labware most likely are being used.

Geographical area of origin of heroin samples. For intelligence purposes, the Drug Enforcement Administration's "Special Resting" Laboratory in Washington, D.C., classifies heroin samples as Southeast Asian, Southwest Asian crude, Southwest Asian refined, South American, or Mexican.¹⁰ For this they use various instrumental methods including capillary column GC, GC/MS, HPLC, and capillary electrophoresis. It is possible that FT-NIR reflectance could perform the basic classification in just a matter of minutes.

Counterfeit Tablet Detection. Although counterfeit Quaalude tablets are rarely seen today, it is not at all unusual for forensic laboratories to encounter counterfeit tablet preparations that allegedly contain anabolic steroids. FT-NIR reflectance should be able to quickly and non-destructively distinguish the fakes from the bonafide tablets.

Comparison of LSD blotter papers. LSD is frequently found impregnated on blotter paper. In the past, the blotter paper usually was perforated into approximately 1/4 inch squares and bore a repeating design on one side. But today the blotter paper is usually just white with no design. It may be possible to categorize different sources of this paper using FT-NIR reflectance.

Authentication of coupons, food stamps, lottery tickets, art works, etc. It is not likely that counterfeiters of the above items will be able to obtain exactly the same type of paper as that used on the bonafides. FT-NIR reflectance

should be able to quickly and non-destructively distinguish between an authentic standard and a suspected fake.

Identification of smokeless powder brands. FT-NIR reflectance should be able to distinguish between the different brands of smokeless powders. This would be useful when trying to match the smokeless powder from a recovered (and unexploded) pipe bomb with that found in a suspect's garage. If these tests prove feasible, then it is likely that with FT-NIR reflectance microscopy one could compare smokeless powder grains recovered from bomb fragments from an actual explosion.

Commercial Product Tampering. Readers may recall the Tylenol[®] KCN poisoning case from the early eighties and subsequent copycat cases. Reference 9 details an FT-NIR reflectance method which could have easily identified the adulterated capsules without having to break them open. For any given forensic laboratory, commercial product tampering cases occur infrequently. But when these cases do occur there is great urgency and the lab's capabilities are overwhelmed. The availability of FT-NIR reflectance instrumentation already on hand and in use for other forensic sample types could greatly alleviate these rare and random crises.

Additional Considerations. In addition to being quick, non-destructive, and requiring minimal sample preparation, FT-NIR reflectance spectroscopy has other attractive features:

No use or exposure to organic solvents. Today the costs associated with the storage and environmentally-approved disposal of organic solvents may exceed their original purchase price. No organic solvents are required for sample preparation in FT-NIR reflectance spectroscopy.

Instrument operation by non-technical personnel. With use of the proper macros, FT-NIR reflectance systems can easily be operated by individuals with limited technical backgrounds. Questioned document examiners would likely find them even easier to use than the VSC-1!

Laboratory Safety. In the investigation of clandestine drug labs (as well as from other random sources), it is not unusual to encounter substances in unlabelled glass containers. Some chemicals are extremely dangerous. They may be able to penetrate various

types of protective gloves or clothing, and just breathing their vapors or airborne dust may either create immediate health problems, or (more insidiously) could lead to later debilitating chronic health conditions. Using your imagination, the chemicals that might be present in a clandestine drug lab are a comparative 'daydream' beside the 'nightmare' of possibilities in the lab of a political terrorist. Since FT-NIR reflectance analysis can be done directly through glass, it could provide at least a preliminary indication of the contents before "Pandora's Box" is opened!

SUMMARY:

FT-NIR reflectance analysis is amenable to the comparison (common origin?, real or fake?, etc.) of numerous types of forensic science evidence. In an era when the integrity, subjectivity, and judgement of forensic scientists is so frequently challenged, the suitability of FT-NIR reflectance data to objective statistical analysis is a definite plus.

REFERENCES

1. Bhattacharya S. Electronic signature: a step toward a true paperless laboratory. *Amer Lab* 1997 Sept;20(18):19-20.
2. Blackledge RD, Gernandt MN. The pH pen—a means of comparing paper products. *J Forensic Sci* 1993;38:134-142.
3. 21 Code of Federal Regulations, Part 11, March 20, 1997.
4. Dudley RJ. The evaluation of methods for soil under simulated scenes of crime conditions. *Forensic Sci Int* 1978;12:49-60.
5. Gerh., usser CI, Kovar K-A. Strategies for constructing near-infrared spectral libraries for the identification of drug substances. *Applied Spectroscopy* 1997;51:1504-1510.
6. Hays PA. Authentication procedure for reference drug standards. *Microgram* 1994;XXVII:14-27.
7. *J Forensic Sci* (in press).
8. Kohn WH, Jeger AN. Identification of drugs by their near-infrared spectra. *J Forensic Sci* 1992;37:35-41.
9. Lodder RA, Selby M, Hieftje GM. Detection of capsule tampering by near-infrared reflectance analysis. *Anal Chem* 1987;59:1921-1930.
10. Lurie IS. The analysis of cations and anions in illicit heroin using capillary electrophoresis with indirect UV de-

tection: application to process determination - Part II. Paper B45, Criminalistics Section, AAFS annual meeting, San Francisco, CA, Feb. 1998.

ACKNOWLEDGMENTS

The SIMCA analysis of the data was performed by Sharon A. Cooke, PhD, Infrared Applications Specialist, The Perkin-Elmer Corporation, Beaconsfield, Bucks, United Kingdom. Thanks also to Steven P. Bouffard, PhD, Product Specialist for Infrared Spectroscopy, Perkin-Elmer Technical Center, San Jose, California, for helpful discussions and for arranging for the loan of the Paragon IdentiCheck[®] FT-NIR system to the Naval Criminal Investigative Service Regional Forensic Laboratory, San Diego. Thanks to the San Diego office of the Secret Service and to Naval Criminal Investigative Service Special Agent Paul McCreary for arranging the loan of the counterfeit twenty dollar bills. The donation of soil samples by Edwin Jones, Ventura County Sheriff's Crime Laboratory, and of duct tape samples by James Gagnon, 3M Company, Amy Mongan, Forensic Analytical Specialists, Hayward, CA, and Tanya Dulaney, San Diego Police Department Crime Laboratory, is gratefully acknowledged.

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the
fifteenth
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15 The
International
Association
of
Forensic
Sciences

at the University of California, Los Angeles.

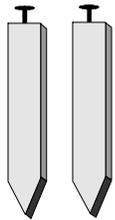
August 22-28, 1999 • Contact Barry Fisher
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Q & A:

How should a body be recovered from an illicit grave?

W. Jerry Chisum¹

The recovery of bodies from illicit graves¹ is always an unpleasant task for law enforcement. If one follows the methodology used in the field of archeology it becomes arduous as well. In the field of archeology each cubic centimeter of soil may contain something of value. The illicit grave, however, is isolated, in time, from any thing that was added to the surrounding soil. The area of interest is what was put into the grave or left on the surface of the ground in the immediate area at the proximate time of the incident. Therefore, many of the techniques used by archaeologists are not necessary—there is an easier way.



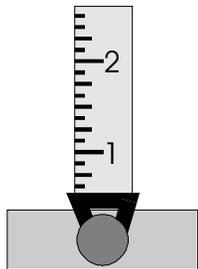
Survey stakes with nails in top.
Figure 1

Easy does not mean that the grave isn't documented well nor does it mean that evidence is overlooked. Easy means less complicated measurements, less labor intensive, and less back strain.

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Reference Points

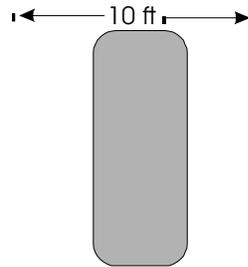
To locate the items in and around a site we must measure to at least two reference points. There is a belief that we must have two "permanent" points to measure. This is not necessary for all the measurements. It is difficult and inaccurate to make measurements over long distances, measurements should be less than 25 feet. To allow for these convenient measurements this method utilizes "artificial" reference points.



Top view of stake with tape attached to nail.
Figure 2

Surveying stakes with nails or screws in the top end are easily carried and make convenient "reference points." The nails are to provide anchors for the tape measures and are used to establish the reference level. The stakes are set a convenient distance apart (ten feet) about 2 feet from the high end of the grave such that they are approximately perpendicular to the main axis of the grave (see Figure 3).

The location of these two points is documented by referring to permanent points. With GPS (Global Positioning System)² an approximate location can be fixed. Then two trees, large rocks or other significant features can be used as permanent ref-



Grave with artificial reference stakes.
Figure 3

erence points to relocate the exact site. These permanent references should be photographed and the distance between them measured. Record the distances between each permanent reference to each artificial reference point to locate the site by the triangulation method.

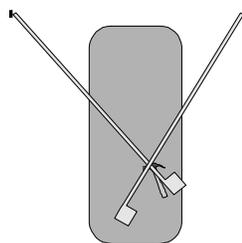
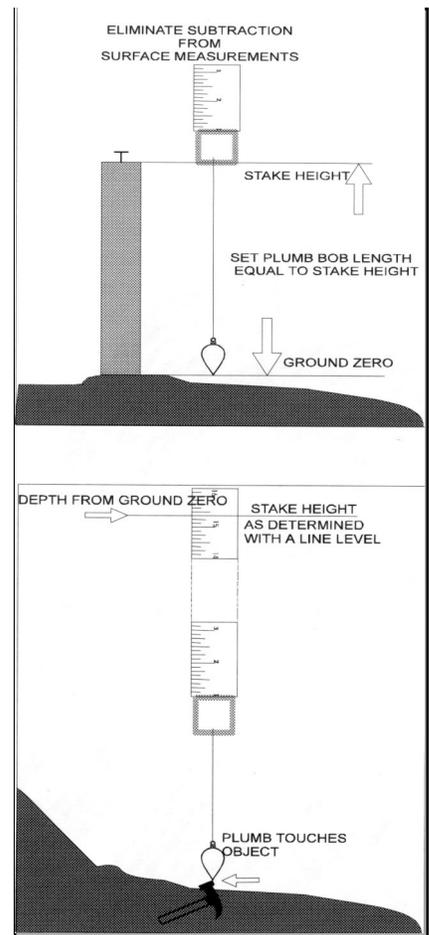
Measurements

The grave edges, the ground surface height, and any objects found inside the grave should be documented in three dimensions. By

putting the open end of the tape over the nail in the end of the

stake (see figure 3), the tape measure can be pulled by just one person. The measurements can be read by crossing the two tapes over the object being measured (figure 4). A plumb bob (weighted string) will ensure that the tapes cross directly over the object. The measurements are put into a table that includes depth. This chart will become the property list as well as the 3 dimensional "map" of the items in the grave. A rough sketch will help keep the measured points clear (see figure 4).

The ground level is measured at as many points as considered necessary. The easy way to get these measurements is to run a level line from the stake on the highest



Cross measuring tapes over evidence as it is uncovered.
Figure 4

ITEM	DESCRIPTION	A	B	DEPTH
Grave	top left corner - surface	3' 1"	7' 4"	2"
	top right corner - surface	7' 2"	3' 0"	4"
	bottom left corner - surface	11' 1"	12' 3"	3"
7	Hammer, top edge of face	9' 0"	7' 6"	17"

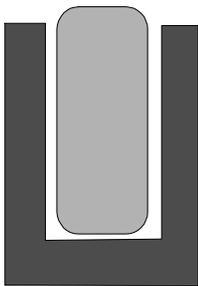
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point of ground (ground zero). The highest point is selected so there are no negative measurements. A plumb bob is attached by string to the end of a tape measure. The length of the string is adjusted so the tape measure end is at the top of the stake. The plumb bob just reaches ground zero (see figure 5). This way all measurements from the level line can be read directly (see figure 6), there is no subtraction necessary for the distance from the level to ground reference level.

These measurement methods are easier and faster than the grid and string methods used in archeological digs. North can be indicated on the sketch, but a north-south baseline should not define your actions anymore than it does inside a house or at any other crime scene.

Trench the Grave

Prior to excavating, an area encompassing about 10 feet in each direction around the grave must be thoroughly examined for evidence. This means the searchers should get down on their knees and examine the area thoroughly. The area should be cleared of grasses and weeds. Depending on the length of time since the incident, the top inch or so of topsoil may need to be removed. Once the topsoil is removed, the grave should be quite clear due to the mixture of soil layers that were brought to the surface.

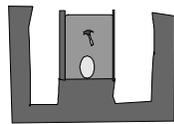


Trench around the grave.

Figure 7

area is of equal importance. In the forensic examination of an illicit grave, only the one area, the grave, is of interest. The soil to the sides of the graves is ignored and can be removed.

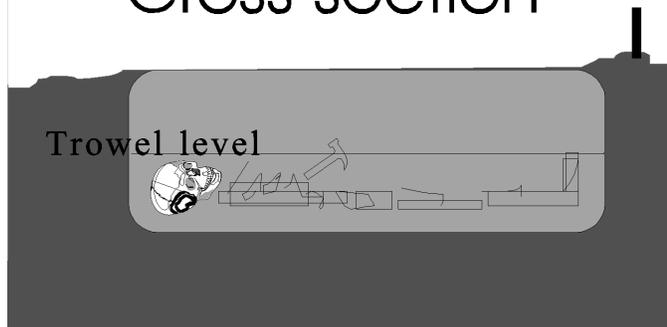
Dig trenches along side the grave and at the end opposite the reference stakes. While heavy equipment is normally not acceptable for digging the graves, trenches can be dug by a backhoe or trencher, being careful to not cut into the grave. The trenches should be wide enough to allow a person to stand and reach across the grave. The depth should be approximately 6 inches



Cross section of trashed grave.

Figure 8

Cross section



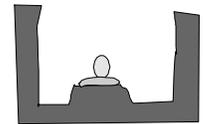
lower than the body. Move the soil resulting from digging these trenches away from the site.

Remove the Soil From the Grave

A flat bladed shovel is used to cut across the top of the grave. The shovel should be held so it removes no more than one inch at a time. This soil is sieved or carefully examined for any evidence that may have been put into the grave during the burial.

Some investigators have suggested examining the sides of the grave for toolmarks left by the digging instruments. It is only the last few inches of the grave that needs to be examined as during the digging process the tool used by the perpetrator is subject to wear. It is only the last use of that tool that will have the marks that would still be on the tool. Therefore, when you reach the body, examine the sides of the grave for toolmarks left by the digging tool(s).

When an evidence object or part of the body is located, the shovel is exchanged for trowels, picks, and brushes to prevent damage or loss. The soil is removed with these tools as carefully as possible.³ This is more easily achieved working from the trenches than it is leaning over the grave and reaching down. The body is not disturbed, it is cleaned of soil, and the soil is removed from all sides leaving the body on a pedestal. (See figure 10).



Leave body on a pedestal

Figure 10

Once the body is isolated it is best if you **stop all proceedings and call a forensic anthropologist**. The anthropologist will want to see the body in situ and can gain the maximum information if they do the actual recovery of the body from the grave.

If a forensic anthropologist is not available to recover the body, you should try to preserve the condition of the body. Slide a sheet of metal or a piece of plywood under the body. Using the metal or wood platform, lift the body straight up. Take the body to the examining area for the anthropologist and pathologist. Videotape the body recovery procedure so that any changes are documented.

After the body has been removed sieve approximately six inches of soil under the body for bullets or other evidence.



Footnotes

¹This paper assumes the gravesite has been located and confirmed.

²Satellite signals give approximate location anywhere on the planet. Or, you can mark the area on a topographical map of the region.

³Photography is not the subject matter of this paper. It is assumed the reader knows to take appropriate photographs of each object when it is located and when it is isolated.

Jerry Chisum Retires, Re-aspires, Re-aligns



What can you say about a career that began in Berkeley and thirty-nine years later is continuing in Brazil? How does one person go from a scientist, to trainer, to CAC president (three times!), president of ASCLD, lab supervisor and author? Read on and I'll tell you about this man for all seasons.

Hundreds of professionals in law enforcement, forensic sciences and of the courts have ben-

efited from Jerry Chisum's long tenure of leadership in the criminalistics craft. I was fortunate to have him as instructor and mentor when I entered the field. I'll describe his contributions from my three viewpoints: career highlights, scientific studies, and Jerry the person.

Career Highlights. Jerry began in this field as a student assistant - criminalistics at the San Bernardino Co. Sheriff Department Laboratory in 1960. Following some coursework under Dr. Paul Kirk at U.C. Berkeley, Jerry was a newly minted B.Sc.-Chemistry graduate when he accepted his first professional appointment at San Bernardino in 1961 (John Davidson and Tony Longhetti worked there at the time). He joined the Kern County Sheriff's Laboratory in Nov. 1964 as chief criminalist before accepting a position with the California Department of Justice (DOJ) in April 1967. At this time there was only one Bureau (Criminal Identification and Investigation, aka - CII), in DOJ's law enforcement division.

Two years later, CAC President Paul Kirk formed a Long Range Planning Committee with John Davis of Oakland Police Department Laboratory as chairman. Jerry and Ted Elzerman volunteered to serve in this review of criminalistics services in California. In 1970 their proposal was submitted to the Office of Criminal Justice Planning with the view toward expanding the single CII Sacramento Laboratory to multiple sites in areas not having their own local lab facility.

Late in 1971, Jerry accepted a position with the Stanford Research Institute NASA Technical Applications Unit. One of many AAFS papers he gave described his work with this group. Meanwhile, the lab services proposal he co-authored resulted in a grant to the state to expand the DOJ laboratory system. In 1973, Jerry returned to DOJ as supervisor of the Sacramento Laboratory. In the following year, he earned a promotion and was reassigned Training Officer. He organized in-service instruction for staff hired for the new Fresno and Redding laboratories. Late in 1974, he accepted the position to start up the Modesto facility. Jerry remained there, contributing to many training presentations over the years: U.S.A., Australia, Taiwan, U.K.

During this era of service, many agencies in the criminal justice system wrote to cite his varied contributions for homicide investigation, crime scene training and scene reconstruction. At the Spring '98 Seminar, he earned the CAC most outstanding paper award. Jerry has testified over one-thousand times in Justice, Municipal and Superior Courts.

The Northwest Association of Forensic Scientists awarded Jerry their highest award for contributions to the field. The California Association of Criminalists awarded him the Outstanding Member Award and several Awards of Merit. He has also been awarded an Award of Merit from

NASA, Outstanding Supervisors Award from the California Department of Justice, and the Outstanding Achievement Award from the Stanislaus County Peace Officers Association.

He was consultant to the National Institute for Law Enforcement and Criminal Justice of the Law Enforcement Assistance Administration. He was also the technical consultant for Prof. Joseph Peterson at the University of Illinois at Chicago Circle study on the utilization of physical evidence in criminal investigations. Dr. Peterson has published several papers and monographs as a result of the study.

In spite of several career moves in this period, Jerry served as president of ASCLD, Stanislaus Co. Peace Officers Association, and CAC (the latter for an unprecedented three terms). For all his career activities, he is probably best known for two things: his 20+ year collaboration with Joe Rynearson on the "Joe and Jerry road show" of crime scene training, and as co-founder of CIRT (Crime Investigation Response Team). This latter was a DOJ task force consisting of criminalists, photographers, latent print analysts and special agents of DOJ's Bureau of Investigation. The team was designed to respond to the more complex crime scenes in the forty-six county service zone of the state lab system. This effort gave rise to specialized training of multiple disciplines which included behavior analysis (profiling) of the offender.

In 1990 Jerry was transferred to the CA Criminalistics Institute to manage training in the crime scene program, then reassigned to the Sacramento Lab as Assistant Laboratory Director (1992-94), and he returned to CCI in 1994.

He was employed as a part-time professor in the Criminal Justice Program at California State University, Sacramento for four years. He taught Criminal Investigation (CJ 4), Criminal Identification (CJ 144), and Introduction to Criminalistics (CJ 146).

He has taught Crime Scene Investigation, Crime Scene Reconstruction, and general Criminalistics classes throughout California and Idaho. He has also taught in Illinois, Oklahoma, Indiana, Arizona, Nevada, New Mexico, and Connecticut. He has lectured on Crime Scene Reconstruction or on the Location and Recovery of Buried Bodies at the FBI Symposium on Crime Scene Reconstruction and Mass Disasters, the First Chinese-American Conference on Crime in Taiwan, the Australian Forensic Society Symposium in Brisbane, Australia, the first and second Serial Murders, Unidentified Bodies, and Missing Persons Conferences held in Oklahoma City and Nashville and the Tri-State Annual Conference on Law Enforcement at Lake Okaboji, Iowa, and in New Orleans this past August.

Scientific Studies. I can remember Jerry's interest and experiments in crime scene reconstruction. In assault cases he would examine bloodstain patterns from the scene or on clothes and test various scenarios of combat dynamics. He would use an articulated manikin or live subject for this purpose. This resulted in several blood spatter demonstrations and provided a foundation for one of the current CCI courses.

A series of technical articles beginning in 1963, continued through this period for 20+ years. These appeared in various peer reviewed and internal publications (JFSS, JFS, Tie Line, etc.). The subject matter covered a wide range of interest with the generalist spirit: serial number restoration on aluminum, rapid method of bloodstain typing, arson accelerant detection, quick saliva test, physical evidence manual, refractive index and dispersion, crime scene reconstruction, footprints, bloodstain pattern recognition, and crime scene review for supervisors. Jerry is certified as a Diplomate of the American Board of Criminalistics.

During 1970, Jerry was able to attend a 1 month training course on electrophoresis presented by Brian Culliford in New York. This experience was the basis of a new (then) way to analyze forensic bloodstains for enzymes and proteins. During the early 1970's, this methodology was adapted by DOJ and city/county laboratories to supplement information from ABO typing.

In 1981, Jerry developed a health problem from exposure to benzidene, which was used as a screening test for the detection of blood. The bladder tumor was removed and follow-up treatment required cytosopic and internal examination for several years (still ongoing). We now know a lot more about these dangers and benzidene and several other chemicals banned from laboratory use. Jerry led the campaign in this regard by giving papers at AAFS and ASCLD on chemical safety.

Jerry the Person. With several career moves, research and training, Jerry has another track record of dedication: to his family. With four sons, he was active in scouting and is one of the few fathers I know that survived induction into the Order of the Arrow. Now he takes great pleasure in displaying photographs of his two granddaughters in his office.

Other office photographs depict his interest in places Polynesian. He has snorkled at the Great Barrier Reef in Australia, and captured the sunset over Tahiti. With a recent inquiry about giving training in Brazil, perhaps other photographs of exotic venues will result. With his wide-ranging travels, Jerry developed a gourmet appreciation for the cuisine of many cultures. He can recite the mysteries in a 1954 Bordeaux, has dined at Mama Leone's in Manhattan, and can use chopsticks. This latter feat was perfected before his 1987 trip to visit the police laboratory in Taiwan during the Chinese-American Symposium on Forensic Science.

His epicurean reputation also extended to the celebration of E Clampus Vitus. This colorful group of red-shirted California historians(?) is known for their miner's meals at various convocations in the mother lode hills. Suitable subjects for Clamper dedication include stage coach stops (original sites of outhouses of the 19th century). I have a number of Clamper era photographs I am holding as "money in the bank!"

As Jerry Chisum leaves DOJ for other adventures, I've shared my views of this special colleague. You now have a view of his extensive career, his scientific studies, and the personal side of the man. I am grateful for his training as I entered the field, his accompaniment at my first court testimony and invaluable counsel in preparation for complex testimony.

CCI and the profession will benefit from the legacy he leaves. Jerry, we hope you will stop by on your many travels and future adventures. All the best—*your pal, Lou.*

*Editor Note: Lou Maucieri is Program Manager, CCI, Quality Assurance. *** RETIREMENT PARTY FOR JERRY, OCT. 23rd: Contact Pamela Schillin, 916-227-3575 for info. ****

TRAINING & RESOURCES VIDEO

SEROLOGY / DNA

- S1 **Electrophoresis Basics**—*Linhart · Glycogenated Vaginal Epithelia* —*Jones · Erythrocyte Acid Phosphatase* — *Rickard · Phosphoglucomutase* —*White / M. Hong*
- S2 **Immunology** — *Stockwell*
- S3 **Gm / Km** —*Stockwell / Wrxall*
- S4 **Peptidase A** — *Yamauchi*
- S5 **ABO** — *Thompson*
- S6 **Saliva** —*Spear* (incl DNA Kelly-Frye/Howard Decision)
- S7 **Presumpt. Tests/Species/ PCR Intro**—*Peterson/Mayo*
- S8 **Gc sub**—*Devine/Navette*
- S9 **Statistics**—*M. Stamm*
- S10 **Haptoglobin** — *D. Hong*
- S11 **Population Genetics & Statistics Course**—*Bruce Weir*
- S12 **Micro. Exam. of Sex Assault Evidence**—*Jones*
- S13 **DNA Workshop** — *Spring 1993*

CRIME SCENE

- C1 **Bloodspatter Lecture** —*Knowles*
- C2 **Bloodspatter Lecture** — *Chisum*
- C3 **Crime Scene Investigation Symposium**—*Fall '88 CAC*

GENERAL INTEREST

- G1 ABC News 9/23/91: "Lab Errors"
- G2 48 Hours 9/25/91: "Clues"
- G3 Founder's Lecture: Stuart Kind—*Fall '93*
- G4 Founder's Lecture: Walter McCrone—*Spr '90*
- G5 Founder's Lecture: J. Osterburg—*Fall '91*
- G6 Founder's Lecture: Lowell Bradford—*Spr '93*
- G7 OJ Simpson Tonight Show Clips
- G8 "Against All Odds—Inside Statistics"

ALCOHOL / TOXICOLOGY

- A1 Forensic Alcohol Supervisor's Course—*DOJ*

TRACE EVIDENCE

- T1 **Basic Microscopy Lecture**—*E. Rhodes*
- T2 **Tire Impressions as Evidence**—*Nause*
- T3 **Evaluation of Lamp Filament Evidence**—*Bradford*
- T4 **FTIR Lecture**—*Moorehead*
- T5 **Gunshot Residue Lecture**—*Calloway*
- T6 **Footwear**—*Bodziak*
- T7 **Footwear Mfg. Tour** —*Van's Shoes*
- T8 **Glass Methods**—*Bailey / Sagara / Rhodes*
- T9 **Fiber Evidence**—*Mumford/Bailey/Thompson*
- T10 **Trace Evidence Analysis**—*Barnett/Shaffer/Springer*

FIREARMS

- F1 **Forensic Firearms Evidence** —*Haag*
- F2 **Wound Ballistics: "Deadly Effects"**—*Jason*

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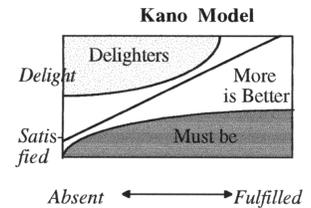


Richard Konieczka

SOUND COMMUNICATION

I was first exposed to the Kano model several years ago. It was used to describe customer's reactions to various levels of customer service. I have discovered it also serves as an excellent model for communication. In a business transaction, certain criteria must be present for a relationship to exist. The level of service in the transaction could be divided into three-levels. First there is "must be,"

secondly, "more is better" and third "delighters." For example, when going into a bank to deposit our paycheck and receive some cash back, certain things must occur. The funds must be credited to the proper account and some cash returned to us. This fulfills the "must be" criteria of the Kano Model. "More is better" would include such things as courteous service, efficiency, and a ready smile.



A delighter would be going the extra mile or an unexpected reward, or an in the moment interpersonal treat, or process delighters, like sending a thank you note. Delighters provide a lift to both the sender and the receiver! The key to effective process or system is to find those that are inexpensive and provide goodwill in excess of their cost. My bank has a 5 minute service guarantee or \$5 cash. I stand in line hoping they take over 5 minutes so I can get my \$5, and the teller is happy to give me the cash, no questions asked. Frequent flyer miles for airlines are an example of how a benefit went from being a 'delighter,' when the first airline offered the benefits, to a 'must be' since all airlines now offer them. Alaska Airlines has found an ingenious way of staying ahead of the competition by offering perpetual miles which never expire. The customer expires, while the miles live on forever, never to be redeemed. This is brilliant, because the customers feel good watching their mileage balances build up, while other airlines force their customers to redeem theirs to prevent expiration. Since many of the miles are never redeemed, this process delighter actually saves Alaska money.

Most interpersonal 'delighters' have no cost and can even help cash flow by the goodwill they create. It doesn't take any longer to provide outstanding service than it does marginal or 'must be' service. As Woody Allen says, 80% is just showing up, but the 'delighters' can take care of the other 20% very nicely. After every phone call or meeting, ask yourself, was my involvement a 'must be,' a 'more is better,' or a 'delighter?' You will know when you've had a 'delighter' and they come when you're in the moment and paying attention.

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California
Association of
Criminalists

A Final Word

Future forensic scientists?

The following are all quotes from the science exams of 11 year-olds:

"Water is composed of two gins, Oxygen and Hydrogin
Oxygen is pure gin. Hydrogin is gin and water." "When you breathe, you inspire. When you do not breathe, you expire." "H₂O is hot water, and CO₂ is cold water." "To collect fumes of sulphur, hold down a deacon over a flame in a test tube" "When you smell an odourless gas, it is probably carbon monoxide" "Nitrogen is not found in Ireland because it is not found in a free state" "Three kinds of blood vessels are arteries, vanes, and caterpillars." "Blood flows down one leg and up the other." "Respiration is composed of two acts, first inspiration, and then expectoration." "Artificial insemination is when the farmer does it to the cow instead of the bull." "Dew is formed on leaves when the sun shines down on them and makes them perspire." "A super-saturated solution is one that holds more than it can hold." "Mushrooms always grow in damp places and so they look like umbrellas." "The body consists of three parts - the brainium, the borax and the abominable cavity. The brainium contains the brain, the borax contains the heart and lungs, and the abominable cavity contains the bowels, of which there are five - a, e, I, o and u." "Momentum: What you give a person when they are going away." "Planet: A body of earth surrounded by sky." "Rhubarb: a kind of celery gone bloodshot." "Vacuum: A large, empty space where the pope lives." "Before giving a blood transfusion, find out if the blood is affirmative or negative." "To remove dust from the eye, pull the eye down over the nose." "For a nosebleed: put the nose much lower than the body until the heart stops." "For drowning: climb on top of the person and move up and down to make Artificial Perspiration." "For Fainting: Rub the person's chest or, if a lady, rub her arm above the hand instead. Or put the head between the knees of the nearest medical doctor." "For dog bite: put the dog away for several days. If he has not recovered, then kill it." "For asphyxiation: Apply artificial respiration until the patient is dead." "To prevent contraception: wear a condominium." "For head cold: use an agonizer to spray the nose until it drops in your throat." "To keep milk from turning sour: keep it in the cow." "The pistol of a flower is its only protection against insects." "The alimentary canal is located in the northern part of Indiana." "The skeleton is what is left after the insides have been taken out and the outsides have been taken off. The purpose of the skeleton is something to hitch meat to." "A permanent set of teeth consists of eight canines, eight cuspidors, two molars, and eight cuspidors." "The tides are a fight between the Earth and Moon. All water tends towards the moon, because there is no water in the moon, and nature abhors a vacuum. I forget where the sun joins in this fight." "Germinate: To become a naturalized German." "Liter: A nest of young puppies." "Magnet: Something you find crawling all over a dead cat."

* * *

Notes from all over

Tennessee: A man successfully broke into a bank after hours and stole the bank's video camera. While it was recording. Remotely. (That is, the videotape recorder was located elsewhere in the bank, so he didn't get the videotape of himself stealing the camera.) *Louisiana:* A man walked into a Circle-K, put a \$20 bill on the counter and asked for change. When the clerk opened the cash drawer, the man pulled a gun and asked for all the cash in the register, which the clerk promptly provided. The man took the cash from the clerk and fled-leaving the \$20 bill on the counter. The total amount of cash he got from the drawer? Fifteen dollars.

New York: As a female shopper exited a convenience store, a man grabbed her purse and ran. The clerk called 911 immediately and the woman was able to give them a detailed description of the snatcher. Within minutes, the police had apprehended the snatcher. They put him in the cruiser and drove back to the store. The thief was then taken out of the car and told to stand there for a positive ID. To which he replied, "Yes Officer, that's her. That's the lady I stole the purse from." *Seattle:* When a man attempted to siphon gasoline from a motor home parked on a Seattle street, he got much more than he bargained for. Police arrived at the scene to find an ill man curled up next to a motor home near spilled sewage. A police spokesman said that the man admitted to trying to steal gasoline and plugged his hose into the motor home's sewage tank by mistake. The owner of the vehicle declined to press charges, saying that it was the best laugh he'd ever had. *Newark:* A woman was reporting her car as stolen, and mentioned that there was a car phone in it. The policeman taking the report called the phone, and told the guy that answered that he had read the ad in the newspaper and wanted to buy the car. They arranged to meet, and the thief was arrested. *Ann Arbor:* The *Ann Arbor News* crime column reported that a man walked into a Burger King in Ypsilanti, Michigan at 7:50am, flashed a gun and demanded cash. The clerk turned him down because he said he couldn't open the cash register without a food order. When the man ordered onion rings, the clerk said they weren't available for breakfast. The man, frustrated, walked away. *Kentucky:* Two men tried to pull the front off a cash machine by running a chain from the machine to the bumper of their pickup truck. Instead of pulling the front panel off the machine, though, they pulled the bumper off their truck. Scared, they left the scene and drove home. With the chain still attached to the machine. With their bumper still attached to the chain. With their vehicle's license plate still attached to the bumper.

* * *

A defendant was on trial for murder. There was strong evidence indicating guilt, but there was no corpse. In the defense's closing statement the lawyer, knowing that his client would probably be convicted, resorted to a trick.

"Ladies and gentlemen of the jury, I have a surprise for you all," the lawyer said as he looked at his watch. "Within one minute, the person presumed dead in this case will walk into this courtroom." He looked toward the courtroom door. The jurors, somewhat stunned, all looked on eagerly. A minute passed. Nothing happened.

Finally the lawyer said, "Actually, I made up the previous statement. But you all looked on with anticipation. I therefore put to you that you have a reasonable doubt in this case as to whether anyone was killed and insist that you return a verdict of not guilty." The jury, clearly confused, retired to deliberate. A few minutes later, the jury returned and pronounced a verdict of guilty.

"But how?" inquired the lawyer. "You must have had some doubt; I saw all of you stare at the door."

The jury foreman replied: "We did look, but your client didn't."

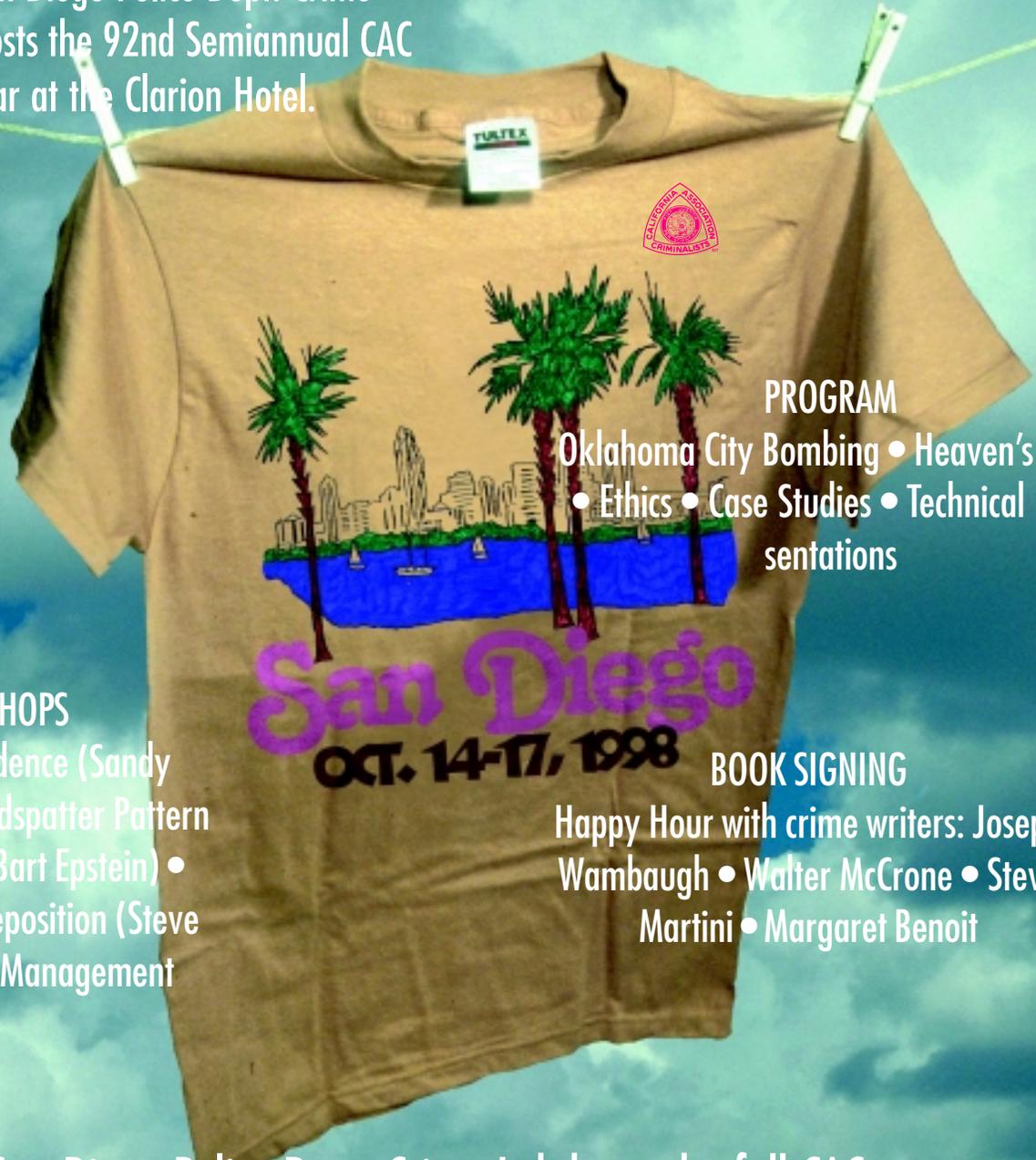
* * *

Face game answers:

Pioneers of the comparison microscope (*l-r top, with approx. date of influence*): Robert Churchill, 1927; Calvin Goddard, 1925; Phillip O. Gravelle, 1925; (*bottom*) Albert S. Osborn 1910; Luke S. May, 1923?; Alexander von Inostranzeff 1885.

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