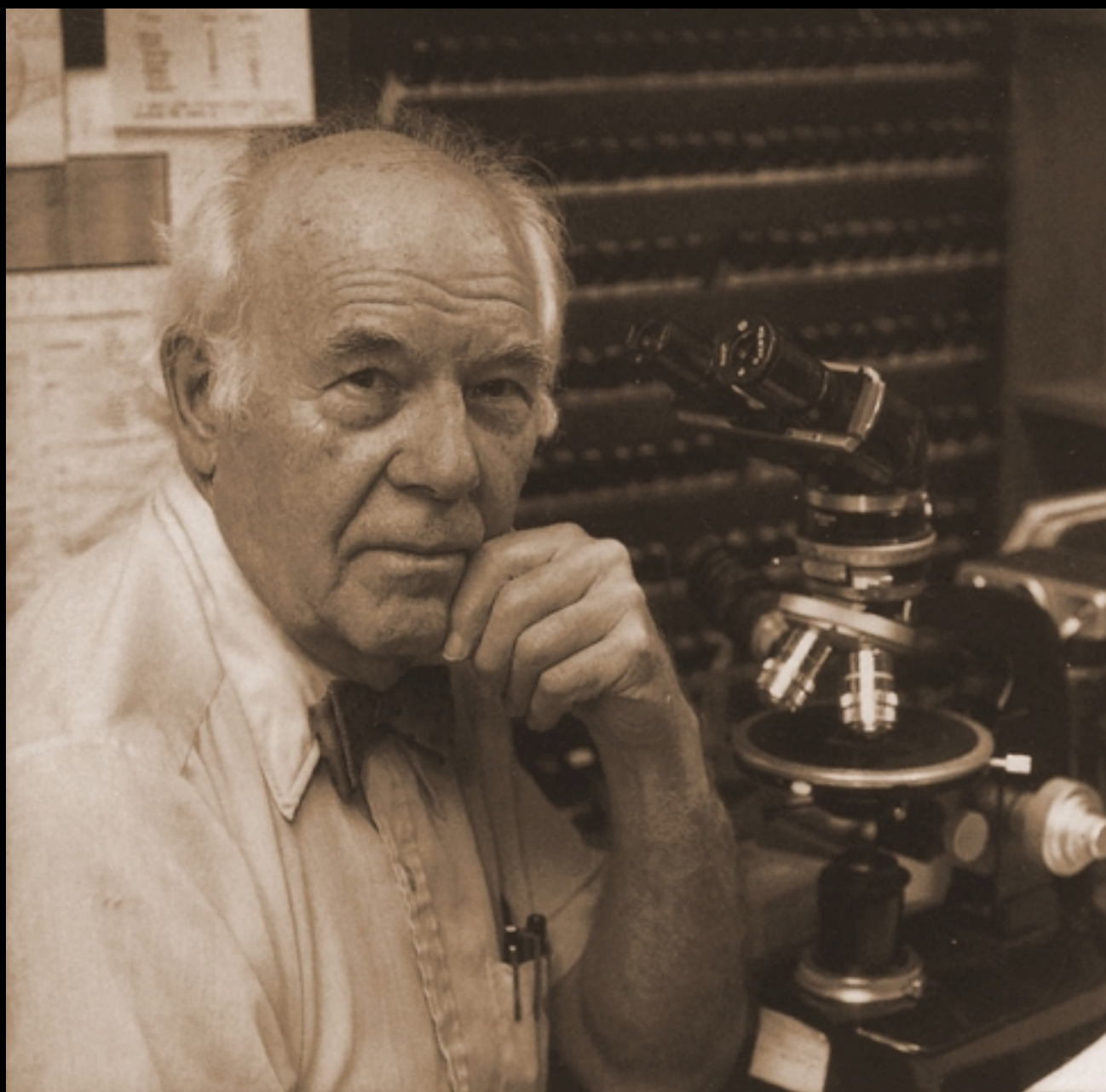


# The CACNews

*News of the California Association of Criminalists • Fourth Quarter 2002*



*WALTER C. MCCRONE 1916—2002*

# The President's Desk

## Growing Up

There is an old joke about the little boy who, when asked what he wanted to be when he grew up replied, "BIG." Unfortunately, there are a lot of people in society today who never aspired to grow up and be anything but "big." Most people over the age of eighteen consider themselves to be adults, but many of them fit the definition of that word in only the narrowest of terms. Many people today fail to understand what the word "adult" means, and they aspire to the status of an adult, without having first earned it. As a result, the world is full of grown-ups who are not adults.

Adulthood is really comprised of six elements; Physical Maturity, Emotional Maturity, Spiritual Maturity, Social Maturity, Intellectual Maturity, and Financial Maturity.

We must not lose site of the well-rounded adult who possesses all six elements above. Many of us tend to work on a couple of these elements and forget about the others. To become the best that we can be we must work on all six elements. The emotionally mature person cooperates graciously with others and does not expect perfection in others. The spiritual mature person is selfless, obedient, humble, patient, kind, and generous. The socially mature person contributes to the community good by promoting good causes, by upholding the law, and participating in the democratic process. This person gives an honest day's labor for an honest day's pay. Integrity, responsibility, and dependability are all traits, which are possessed by someone who is socially mature. The intellectually mature adult is able to communicate effectively both orally and in writing. This person recognizes that school is a serious business and sets realistic goals. The financially mature adult lives within their means and recognizes the difference between needs and wants.

More and more grown-up children are returning home to live with their parents. More and more grown-up children are postponing employment, and instead opt to remain in college, changing majors, and switching courses until graduation and the "real world" become just a fuzzy blur on the horizon. Scientists have theorized about what has caused the shift but instead of looking at the cause we need to identify a solution. The surest way of achieving contentment and success in an uncertain world is to embrace genuine adulthood, rather than postpone or avoid it. I believe many forensic scientists have done just that. Most forensic scientists like what they are doing and are content with the success of each case they work on. I am pleased to be in this field and have enjoyed the friendships I have developed with my fellow scientists and within the California Association of Criminalists. May we all continue to strive to be the best that we can be and work on all elements of our adulthood.

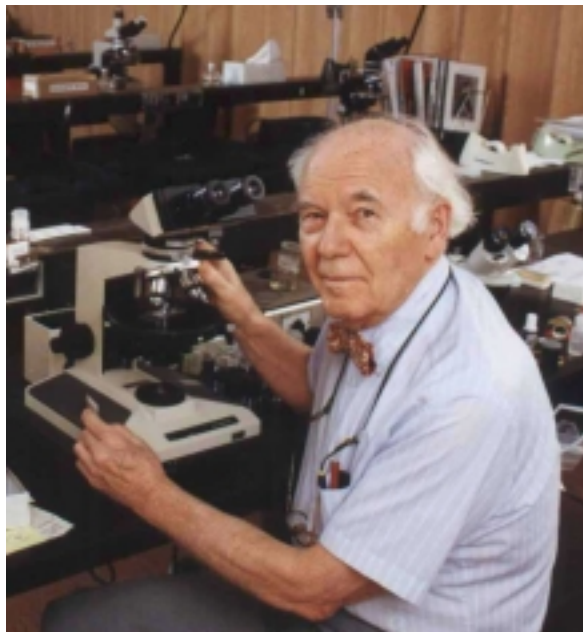
Michael

THE SUREST WAY  
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AND SUCCESS IN  
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RATHER THAN  
POSTPONE OR  
AVOID IT.



Michael J. Parigian  
CAC President

## Fourth Quarter 2002



*On the cover...*

*Dr. Walter C. McCrone. His biography appears inside this issue. Cover photo by Joseph Barabe, McCrone Research Institute, used by permission.*

## C O N T E N T S

### **2 President's Desk**

Michael Parigian

### **4 CACBits / Section Reports Jobs / Meetings / Courses**

Jan Bashinski Retirement

### **6 Fall Seminar Announcemnt**

Workshop Descriptions

### **7 Editorial Secretary**

A Final Tribute

### **8 Feedback**

Our Readers Respond

### **10 Walter "Doc" McCrone**

A Pioneer in the Science of Microscopy

### **12 Fall Seminar Tentative Schedule**

### **13 Why I'm Glad I Wasn't an Archaeologist**

Jim White

### **14 Fire Investigations and the Forensic Lab**

John DeHaan

### **17 Endowment Fund Call For Proposals**

### **19 The Proceedings of Lunch**

Norah Rudin and Keith Inman

## P U B L I C A T I O N   S T A F F

Art Director  
**John Houde/Calico Press, LLC**  
(206) 855-1903  
john@calicopress.com

Editorial Secretary  
**John Simms**  
(619) 531-2577  
vis@pd.sannet.gov

Technical  
**Jennifer Shen**  
(619) 531-2655  
vls@pd.sannet.gov

Webmaster  
**Mark Traughber**  
909-361-5000  
mark.traughber@doj.ca.gov

Advertising  
**Brenda Smith**  
(661) 868-5367  
bsmith@co.kern.ca.us

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## Been There, Done That and How!

### *Jan Bashinski Hangs Up Her Lab Coat*

*"Keep it short" she said. "We'll try" I responded unconvincingly, unconvinced. "Nobody likes long speeches," that familiar note of persistence in her voice. "Of course. You're right. We'll try."*

*Alrighty then! No pressure....*

Thus, with her admonition weighing just a bit on my mind, Lance Gima, a host of people at the Department of Justice, and yours truly began the process of planning a retirement party for one Jan S. Bashinski. And, privately, I pondered how to reconcile her friendly advice with the reality of her truly extraordinary 38-year career in criminalistics. This was not going to be easy. In fact, it could prove more difficult than trying to complete the fourteen "goals" she assigned to me during one particularly memorable evaluation period in the early 1980's (the first three of them accounted for more than 100% of my work day—my Herculean Labors as I fondly refer to them.) But, I digress.

Jan embarked on this excellent adventure in 1964. Freshly armed with a B.S. in chemistry from UC Berkeley, she began her employment at the Oakland Police Department—the first woman to join the staff as a criminalist. It was to be the first of many "firsts." John Davis was the head of the laboratory then, and Jan always considered herself exceptionally fortunate to have been able to work along side him. She considered him her mentor. They collaborated on research and published methods for the ABO typing of dried bloodstains and the detection of lead in gunshot residue using sodium rhodizonate. Jan credits Davis with teaching her to think open-mindedly about evidence

and cases, and to approach reconstructions methodically. He instilled in her a respect for the general criminalist approach to physical evidence and an unerring ethical compass. While working full time and raising two children, Jan completed a Master of Criminology degree in criminalistics at U.C. Berkeley in 1974.

After John Davis' retirement in 1977, Jan succeeded him as laboratory director—the first woman to reach that position in a California crime laboratory. She added new service areas, new technology, and more women to the lab. When the distaff population finally tipped the scale, local colleagues began referring to OPD as "the sister's lab." In 1983, due to Jan's determination and leadership, OPD became the first crime laboratory in the state and the fourth in the nation to be accredited by ASCLD/LAB.

While at OPD she collaborated with longtime colleagues Ed Blake and George Sensabaugh on federally funded research that advanced our abilities to derive genetic information from sexual assault evidence. In several key presentations in the early 1980s, she promoted the application of a stepwise logic in consideration of typing data recovered from sexual assault evidence. This approach was designed to prevent interpretations from being biased by knowledge of the suspect's genetic types. While the logic was embraced by some in the forensic community, it was not universally appreciated, much less employed. At the time, it was controversial, provocative even. And, ultimately right.

These presentations were but a few of the sixty-eight publications, presentations, and invited lectures in which she was involved.

Jan left OPD in 1989 to take on the new challenge of building, for scratch, the state DNA laboratory program and statewide DNA Offender Database. Under her leadership, the program expanded from two persons (herself and Ken Konzak) to approximately 30 staff. It has since grown to 100. Technology evolved from first generation RFLP methods to emerging PCR based STR methods. In 1993, the DNA laboratory became accredited—the first of the DOJ labs to do so. The other DOJ laboratories followed suit in 1994.



**Jan has never been one to sit on the sidelines. She has always been actively involved in professional organizations, and has been a great advocate for the forensic science community.**



# Jobs • Meetings • Courses

After a stint as Acting Assistant Chief of the Bureau of Forensic Services, she was appointed Bureau Chief in 1995 (risking redundancy here, but another “first”). Jan not only sought funding for the Department’s laboratories, but also for all the forensic laboratories in the state operated by local law enforcement. She was successful in obtaining and administering multimillion dollar grant funding from both federal and state sources. A National Institute of Justice *DNA Improvement Act* grant project allowed both DOJ and other California public agency crime laboratories to enhance and improve their DNA typing capabilities; and a \$50 million grant awarded by California’s Office of Criminal Justice Planning created the “Cold Hit Project”—a three-year program aimed at eliminating the backlog of unsolved sexual assault cases in California. Time and again, and very much to her credit, Jan chose to pursue unprecedented cooperative partnerships aimed at improving the *entire* forensic science system in the state.

Jan has never been one to sit on the sidelines. She has always been actively involved in professional organizations, and has been a great advocate for the forensic science community. And she encouraged everyone who worked with her to be involved and to contribute. Long a member of the CAC, she has served on the Board of Directors for four years, as President in 1977-78 and in many other key roles. The CAC recognized her many contributions to the Association and the profession in 1984 when she was presented with the Distinguished Member Award. She was honored again in 2002 when she was made a Life Member.

A Fellow in the Criminalistics Section of the American Academy of Forensic Sciences, she served as Criminalistics Section Program Chair in 1983 and 1984, Section Secretary in 1984, and Section Chair in 1985. She has served on the Editorial Board of the *Journal of Forensic Sciences* since 1991. Her scientific contributions to the Academy were recognized 1992 when she was awarded the Criminalistics Section’s Paul L. Kirk Award. Her history of service to the Section was recognized earlier this year when she was selected to receive the Mary M. Cowan Outstanding Service Award. The award will be presented next February in Chicago.

Though not quite “The First” this time, there were still fewer than a dozen women members when Jan joined ASCLD after her 1977 appointment as OPD lab director. She served two terms on the Board of Directors of ASCLD and in numerous other capacities, as well. She was Chair of the Laboratory Standards and Evaluation Committee in 1986-87, and she was Executive Secretary to ASCLD/LAB from 1984-89. She has been tapped many times to lead inspections around the country for ASCLD/LAB.

She has always believed in the need for the forensic science community to take responsibility for its own professional destiny. She has been a champion of certification and accreditation and was out front in these endeavors early on. But she also worked effectively behind the scenes on many issues, wielding her considerable influence locally, regionally and nationally. I have had the opportunity to witness her at work in this way on a number of occasions. Certification was an area in which she was very influential, both publicly and behind the scenes. Likewise, she was influential in promoting changes to the Scientific Working Group process that have helped to make them more open and responsive to input from the broader forensic science community. There are other examples of which I am aware; I am equally certain there are many I don’t know about, but would be grateful for.

Her ability to influence others would prove an oft-mentioned theme at her retirement celebration. ASCLD President Susan Narveson remarked on Jan’s uncanny ability to wield influence, crystallize complex issues, and offer solutions in non-confrontational ways. Susan said she tries to follow Jan’s example of respecting the input of others, regardless of whether she could agree with it.

All of which brings us to May 16<sup>th</sup>. One hundred sixty family members, friends, and colleagues gathered on the patio of the Firehouse Restaurant, blessed by a perfect, balmy Sacramento Valley evening. Guests from around the state and across the country assembled to honor Jan’s achievements, to share some pretty funny stories and testimonials, and to enjoy a photographic retrospective of a career characterized by equal parts zest, impatience, good humor, great intelligence, and total commitment.

The names of fifteen speakers appeared on the official “Schedule of Event”; at least an additional ten speakers, representing various organizations and laboratories, presented awards and offered unscheduled, but moving tributes. Before the evening ended, ASCLD/LAB had awarded her the Douglas M. Lucas Distinguished Service Award. The National Center for Forensic Sciences presented her with its first Outstanding Achievement Award, and the Department of Justice announced its intention to name the state DNA laboratory in her honor.

And so it went. Three hours, forty minutes later, 25-plus testimonials spoken, awards piled high, and prospects of eponymous architecture in her immediate future, the last of us wandered out onto the raised wooden sidewalks of Old Sac and watched as Jan was whisked away in a stretch limo—husband Jere having been persuaded to leave the pickup truck at home.

Thus begins the next chapter of her excellent adventure, her extraordinary career.

Keep it short? Not a chance.

The author acknowledges and thanks Lance Gima and Marty Blake for their valuable contributions in preparing this article.

—Mary M. Gibbons

## FSS-CAC Joint Meeting Announcement

The 4th Joint Meeting of the Forensic Science Society and the California Association of Criminalists March 19-22, 2003 at the Oxford Hotel. Please visit [www.cacnews.org](http://www.cacnews.org) upcoming events page for the details of the meeting itinerary.

## IAMA Has New Website

The International Association for Microanalysis (IAMA). IAMA now has their own website. It is located at [www.iamaweb.com](http://www.iamaweb.com). IAMA was created to provide forensic scientists with an informative resource relating to the detection of forensic evidence by microanalysis. Currently, IAMA is internationally recognized with over 150 members.

IAMA is committed to providing information that is timely and beneficial, and we welcome any papers or articles regarding research projects, proposals, or interesting case studies for the quarterly Newsletters. Suggestions for topics and articles are also welcome.

Excerpted from the  
*CAC E-News Update* 8/15/02

## Fall CAC Seminar Announcement

50th Anniversary Fall 2002 CAC Meeting, 100th Semi-Annual Seminar is to be held at Huntington Beach, CA October 14-18, 2002

The Hilton Waterfront Beach Resort is located at 21100 Pacific Coast Highway, Huntington Beach, CA 92648. The Resort is west of John Wayne County Airport and is south of the popular theme parks, Knott's Berry Farm and Disneyland. The hotel is directly located on the beach within walking distance to Huntington Boardwalk/Pier as well as the downtown Huntington Beach.

## Workshops

**DNA** -Tuesday, October 15, 2002 For many crime labs in California, Short Tandem Repeat (STR) DNA typing technology has become one of the most powerful crime-fighting tools at our disposal. The near-universal use of the "CODIS 13" - the 13 loci required for use of the FBI's Combined DNA Index System (CODIS) - allows us to efficiently search the convicted offender and forensic unknown databases. In fact, the State of California has developed a coordinated approach to processing sexual assault evidence known as "The COLD HIT Program." It is anticipated that the DNA workshop will feature remarkable casework experiences with STR typing and plenty of advice on such issues as data analysis and mixture interpretation. Some of the issues we will address on "The CODIS Quagmire" will be: • Review of CODIS procedures and regulations (Which samples are eligible?) • Procedures to follow in the event of a cold hit • QA/QC of outsourced casework • Update on DNA database legislation • CODIS 6 Development JAD team.

If you have DNA research project data, an interesting case involving the use of DNA, or technical advice on such topics as STR data analysis and mixture interpretation, we want you to speak at the October 2002 CAC Fall Seminar DNA Workshop.

**ARSON-Fun With Fire Scenes:** A live-burn workshop on fire behavior and scene examination Monday afternoon and Tuesday, October 14 & 15, 2002 (Class Maximum 24)

A workshop intended to familiarize criminalists with fires and their aftermath firsthand. Live fires will be set in furnished rooms. Data will be gathered on temperatures produced and time of development of both accelerated and non-accelerated fires. There will be classroom sessions on post-fire indicators and fire dynamics as well as hands-on examination of fire debris. Aspects of lab analysis, including, but not limited to, GC analysis of fire debris, will be discussed. Evidence of both incendiary and accidental fires will be examined. Bring gloves, work boots, camera, film (or disks), coveralls, and dust masks. Instructor: Dr. John DeHaan, FABC, FSSDip Consulting Criminalist Fire-Ex Forensics, Inc.

\*Low Level Alcohol Impairment—Monday and Tuesday, October 14 & 15, 2002 (Class Maximum 40 - Priority will be given to CAC members)

This workshop applies to both novice and experienced criminalists performing analysis and testifying in the challenging arena of Forensic Blood Alcohol. Course content includes not only the foundational pharmacological aspects of alcohol that would be expected in an alcohol workshop, but goes forward to cover low level alcohol impairment issues in detail and gives the attendee an opportunity to use this knowledge at an end of course mock trial. Concepts will be presented to attendees using video, lecture and practical formats to reinforce critical information.

Instructor: Dr. Marcelline Burns Dr. Burns has extensive experience in these areas and is credited for performing the original studies to standardize and validate roadside testing. Instructor: Mr. Dary Fiorentino

\* Sponsored by the A. Reed and Virginia McLaughlin Endowment Fund

\*Technical Writing for Forensic Specialist—Tips and Trends—Tuesday, October 15, 2002 (Class Maximum 25)

One should aim not at being possible to understand but at being impossible to misunderstand. (Quintillian) A lofty goal, but certainly not applicable to the forensic scientist.

The forensic specialists duty is to disappear as quickly as possible from both crime report and lab report to retain objectivity and professionalism. Or is it?

The lab report finds that A is maybe, apparently, possibly, seemingly, probably consistent with A, but its just a scientific finding, that's all, no need to make a case out of it, and she needs her weasel words, thank you.

The crime scene report introduces the forensic specialist, makes him beat a hasty retreat, reports what was observed, what was done, what was said, and then hauls the specialist back in to sign his name, I. Wuzinther.

Quintillian obviously didn't have The forensic specialist in mind when He penned his lofty words. Or did he?

What are today's trends in Technical writing? Should reports leave room to be misunderstood? And how important are punctuation and grammar rules? This course will teach current technical writing trends and tips, including: • First person vs. Third person • Active voice vs. Passive voice • Plain English vs. Scientific jargon • The four sentence structures • The three deadly sentence errors

So bring your pens, notebooks, and questions to this writing seminar. Instructor: Anne Neumann, MA, JD. \* Sponsored by the A. Reed and Virginia McLaughlin Endowment Fund

**WOUND PATHOLOGY** - Monday and Tuesday, October 14 & 15, 2002 (Class Maximum 40)

This two-day course is intended to cover, in considerable detail, the examination, interpretation, and documentation of some of the most common means of homicidal and suicidal deaths. These are blunt and sharp force injury, gunshot wounds, shotgun wounds, and asphyxiation. Accidental, natural and undetermined manners of death will be included so as to cover all five manners of death. In addition, two less common and less familiar topics associated with crime will be covered. Burns, fire and arson cases are subject to misinterpretation, as are electrical deaths.

The presentation will consist largely of projected images, accompanied by a plain language dialogue, detailed handouts, and how to look at a body and interpret what you observe. The handouts will include a section on helpful resources, further reading materials, references, and forms to help with note making. Instructor: Dr. Patrick Besant-Matthews Dallas, TX.

# A Final Tribute

It's the bow tie that comes to mind first. Then, it is the boyish grin that lit up his eyes. He would always look down as he chuckled. Dr. Walter McCrone was one of the kindest souls I have ever met and the most gifted when it came to the microscope.

I was lucky to have known Dr. McCrone and even luckier to have benefited from his teachings. I was honored when he mentioned me by name in one of his books. Early in my career I completed several classes personally taught by him. From Chicago to Atlanta to Orange County, his classes provided my foundation of expertise in fibers, soils, glass, drugs, and general microscopy, the backbone of trace evidence analysis. And could he roll crystals!

Dr. McCrone was a wealth of information and was always willing to provide his written reference materials at bargain costs, especially if he knew you were paying for it out of your own pocket.

You could always expect several things out of his classes: 1) he would examine any unknown brought to him by the class members as a challenge and he got pretty close to identification on most occasions, 2) if the class was presented as a roadshow, he would collect soil samples from the students to add to his collection of hundreds if not thousands of soil samples from all over the world, 3) you could expect to laugh, and finally 4) you could expect to learn.

In addition to the classes he taught, his expertise was sought continually to solve mysteries from all over the world. These mysteries were not always forensic and I want to mention just two of Dr. McCrone's special projects. He was noted in particular for the work he did on the renowned religious artifact known as the Turin Shroud, and perhaps to a lesser degree, he was known for his work on the Vinland Map.

## Turin Shroud

He conducted this work in the 1970's. In one of my first classes with him, his work was being published in a series of three booklets. He explained to the class that the image of Jesus on the shroud had been made with an iron oxide pigment that was not in use until the 13<sup>th</sup> or 14<sup>th</sup> century. He was careful to clarify that he could not tell if the pigment had been used as a restorative process over some other image originally on the shroud, but at least the top layer, the most visible aspect of the image, was from the iron pigment.

Dr. McCrone's findings themselves caused controversy, as there were scientists who were ready to believe in the authenticity of the cloth and its image. The controversy raged for years until he decided to write a formal book dealing with the issues. He came to our CAC fall seminar in 1998 with dozens of copies of his book which were quickly sold out. He was absolutely confident of his findings and frankly never understood why there was any question. If you listened to him or read his published work, you were also convinced of his findings.

## The Vinland Map Controversy

The Vinland world map, currently being held in the Yale University Manuscript Room, came to light in 1957. It portrayed the new world several years ahead of the discovery by Columbus, thus appearing to change history if it was authentic. In the 1970's, Dr. McCrone had an opportunity to study the map microscopically. To the naked eye, there appears to be yellowish bleeding of the black map lines. Experts have determined that the yellow bleeding is a natural occurrence of aged, medieval manuscripts. Since there was yellow bleeding on this document, it thus suggested authenticity. Dr. McCrone analyzed the yellow areas and found high concentrations of a pigment known as anatase in a form that was not known until 1920. He interpreted the results as showing that the yellow lines were not bleed lines but were distinct lines drawn first onto the parchment. Then the black ink was drawn over the yellow to make it look as if natural yellow-bleeding had occurred due to aging. The paper was determined to be of the proper age, but parchment paper is easily available from old manuscript books. According to Dr. McCrone, however, the map lines were recent.

Again, controversy raged between those pushing authenticity and Dr. McCrone. "Double inking had never been seen in any historical forgery," the critics argued. Sophisticated instrumental analysis also seemed to contradict Dr. McCrone's microscopic analysis.

New publications have just come out showing support for Dr. McCrone's early findings on the Vinland Map. *Chemistry and Engineering*, August 12, 2002, has published new data showing that the black ink is carbon-

based, making it impossible to yellow-bleed as a result of aging. *Analytical Chemistry*, August 1, 2002, also published an article discussing how Raman Spectroscopy has again confirmed the presence of carbon in the black ink, thus supporting the 1970's conclusion of Dr. McCrone that the parchment may be authentically old, but the lines were drawn after 1920.

If you listened  
to him or read  
his published  
work, you were  
also convinced  
of his findings.

## In Final Tribute

I recount these two great pieces of investigative work by Dr. McCrone to illustrate that his impact was much broader than that which he had on us as individuals in the scientific community. He enlightened us with his knowledge. He enriched us by sharing his skills. His legacy can be described with one word—*greatness*.



**John Simms**

CAC Editorial Secretary

*John*

## May CAC Meeting Helpful to Central America

Editor

I attended the Semi-Annual CAC Seminar last May in San Francisco. I wish to express my appreciation to the organizers of the Seminar for bringing profound meaning to the Seminar's title, Bridging the Forensic Sciences, by including the presentations related to Panama's efforts to find and identify that country's victims of forced and clandestine disappearance during its recent past of military dictatorship. The findings of Panama's Truth Commission (Comision de la Verdad de Panama) were described by its Executive Director, Anthropologist Mr. Bruce Broce. This was followed by a talk from Dr. Sudhir K. Sinha of ReliaGene Technologies Inc. (New Orleans, LA). ReliaGene was commissioned by the Truth Commission to undertake the identification of human remains by comparative mitochondrial DNA typing of remains and reference samples from families of the victims. The convergence of forensic archeology, anthropology, odontology, pathology and genetics (even animal behavior as exemplified by the remarkable abilities of a canine to locate human skeletal remains) has been instrumental in Panama as well as in other nations, attempting to document crimes of forced disappearance. In Central and South America alone it is estimated that at least 90,000 persons are among the victims of forced disappearance during the last 35-40 years. The integration of criminalistics in human rights investigations and the development of internationally accepted protocols thereof, will be enhanced by professional associations such as the CAC becoming familiar with the great needs to integrate the forensic sciences as part of the very difficult task of documenting genocide and crimes against humanity. I felt that the CAC during its May meeting took an important step in that direction.

*Cristian Orrego  
Berkeley*

## "Doc" McCrone Recalled

A giant of the forensic sciences has fallen and passed on to his undoubtedly great reward. I never had the privilege of studying under him, but have known several who did. The man was truly a legend in his own time, and unlike so many other modern icons, he actually deserved that status. Walter McCrone will never be forgotten, and his contributions to the field live on, now and forever. Thank you, Dr. McCrone - may you rest in peace.

*Bob Parsons, F-ABC  
Ft. Pierce, FL*

Today we mourn the passing of Dr. Walter McCrone. He passed away this morning after battling congestive heart failure for the past year. But today, let us remember Dr. McCrone and celebrate the scientist, teacher and humanitarian. Dr. McCrone founded the not-for-profit McCrone Research Institute after earning a Ph.D. in Chemistry, under Emile Chamot, from Cornell University. His vision was to conduct research in and teach chemical microscopy. The institute has taught thou-

sands of students different microscopy techniques, from asbestos identification to mold and fungus spore identification. Dr. McCrone also founded McCrone Associates, an analytical services lab, and McCrone Accessories, which sells laboratory equipment for microscopists. Dr. McCrone and the McCrone Research Institute was well known for art conservancy, and determining whether a painting was fraudulent. His work in this area led to his invitation to work on the Shroud of Turin. This most controversial of cases led to ridicule and hate mail from believers, but he was recognized by the American Chemical Society for his work on the Shroud. Dr. McCrone was also a humanitarian. He took over the reins of a failing community outreach program in the Chicago area that now has hundreds of employees and social workers and a \$40 million operating budget. The most incredible fact about Dr. McCrone is that even with all the responsibilities of the McCrone Research Institute and McCrone Associates (there is a branch in London) he was very personally involved in the running of his outreach program. Dr. McCrone touched so many people's lives, as a mentor and teacher, as a researcher and scientist, and as a humanitarian and philanthropist. He gave up control of McCrone Accessories and McCrone Associates, and eventually McCrone Research Institute, but his influence in the fields of chemical microscopy, art conservation and forensic science will be felt forever.

*Gene Lawrence  
San Diego*

## Just an Ego Trip?

A letter from John Houde in the last issue [The *CACNews*, 3<sup>rd</sup> Qtr, 2002] addressed the value of CAC membership and participation. John's telling of a member being "hassled" by a lab manager for spending too much time on CAC business triggered in me the following Pavlovian response (to be truthful, my blood pressure went up but I didn't slobber).

I recalled the reaction of my lab director (many years prior to my coming to California) when in his office I argued that I should receive special consideration for funding to attend a forensic science conference. I said that unlike the other supplicants, rather than just attending, I was scheduled to give an oral presentation detailing the results of my research in a new area of trace evidence. I reasoned that this would enhance the reputation of the laboratory in the forensic science community. His response was to sneer and say, "That's just an ego trip!"

Happily, I can say that in a career spanning over three decades, that response was very much atypical. Prior to my coming to the Naval Criminal Investigative Service Regional Forensic Laboratory—San Diego, its first laboratory director, Dorothy Boyer, had instituted a policy that Fridays were to be devoted to research. If need be, you could sign out and go to one of several university libraries in the area, just as long as you were involved in some area of forensic science research. Laboratory staff was treated as responsible, adult, forensic science professionals—and responded accordingly. Yes, there was accountability. Each staff member was expected as a minimum to give per year either one oral presentation at a forensic sci-



ence meeting, or to publish one paper. On a less formal basis, Dottie's policy was continued by her successor, Brandon Armstrong. Our current director, Dawn Sorenson, having herself an impressive background in both forensic science research and active participation in professional organizations, could not be more supportive.

Unhappily, many shortsighted lab managers do not support forensic science research. Recently, I was collaborating with a forensic chemist in a distant city who was employed by a large national organization with many regional forensic laboratories. After some promising initial results, he had to sadly tell me that an edict from the Washington, D.C. headquarters had proscribed any future research by bench chemists. Just this spring I contacted two CAC members (from different labs) who are internationally known and respected for their expertise in microscopy. I told them I was putting together a study proposal regarding the development of a protocol for the forensic characterization of glitter-type cosmetic particles, and asked if they would be interested in a collaborative effort. Both thought the project was well worth doing and were eager to participate. However, their lab managers said that any participation could only be done on their own time and could not involve laboratory instrumentation or supplies.

In the first sentence of the above paragraph I characterized such lab managers as "shortsighted." How can they be blind to the long-term value of a laboratory policy of support for research and participation in professional organizations? In her book, *The Virtue of Selfishness*, Ayn Rand, the famous philosopher, admonished that one should never do something that is not in their long-term best interest. Here's a simple example: Should you work late on an important case, or should you go watch/support your daughter as she plays in a soccer match? Short-term, if you stay late and work your lab manager will be pleased (and less likely to "hassle" you). Long-term, a year, five years, ten years from now that case (and perhaps that lab manager) will be long forgotten, but the golden hours spent with your daughter in her youth will remain priceless. Let's apply the same reasoning to participation in forensic science research. Short-term, initially there would be more cases worked/week/month/year if research were banned. Long-term, the best and brightest of your staff will leave. Some will go to other laboratories, and some will leave the forensic science field entirely. The employees who remain will be those virtually unemployable elsewhere. Whatever spark of enthusiasm for their work they once might have had will have been lost. They will have become timeservers counting the days till they retire. If any lab managers are reading this, here is a clue that may tell you what type of employees you supervise and thereby tell you something about your own management style: When your employees are on break and are relaxing what do they talk about? Do they talk about interesting, unusual exhibits or cases they are working on? Do they talk about exciting new areas in forensic science? Or do they talk about their hobbies, Oprah, or their plans for the weekend?

Years ago I worked in a small crime lab in Florida that was located on the campus of a community college. Part of my duties included teaching a class in police administration. Because of that class I know something about August Vollmer. Vollmer was Chief of Police in Berkeley, California. Although his was a small department, the men under him that he trained and mentored left his department (with Vollmer's blessing and strong endorsement) and went on to be outstanding police executives all over the world and to teach and mentor others as

Vollmer had taught them. Although Vollmer started the first crime lab in the U.S. (it was in Los Angeles), he was not a crime lab director. In criminalistics, Paul Kirk had an influence similar to that of Vollmer, but Kirk's influence and mentoring came not as a crime lab director, but rather as a professor in the forensic science program at the University of California at Berkeley. I know of no crime lab director who has served as a teacher and mentor to anywhere near the extent as Vollmer and Kirk. Why is this?

I have little patience with people who are always complaining, but are never willing to make specific suggestions for how an intolerable situation may be remedied. Rather than complaining, perhaps it would be in the CAC's long-term best interest to applaud, encourage, and recognize those lab managers who by their demonstrated policies embody the leadership and mentoring values of Vollmer and Kirk. I would suggest that this recognition be called The August Vollmer Award. This would not be an annual award; it would only be awarded to the most deserving, and the recipient would not have to be a CAC member.

Bob Blackledge  
San Diego

[The above opinions are strictly my own. They do not necessarily reflect positions held by the Naval Criminal Investigative Service or the Department of Defense.]

### Can't Find It?

To reduce the costs of publication, the *CACNews* may place calls for nominations and other items that were previously found in the newsletter mailing as inserts **ON THE WEB**.

Visit [www.cacnews.org](http://www.cacnews.org) to see what is offered. Content changes periodically, so visit often!



### Calling All Microcrystal Drug Chemists

We are planning a publication on the identification of drugs by microcrystal tests as a collaborative effort of the members of the CAC. This will be an easy-to-use reference guide including color photographs, the latest "designer drug" tests, and validation studies.

We are looking for individuals who wish to contribute photographs from their collection, prepare new photographs, do some research, and write sections of the paper. All contributors will be acknowledged.

**Sound interesting? Contact Patricia Lough at 619-531-2460 or email [pk1@pd.sannet.gov](mailto:pk1@pd.sannet.gov) to get involved!**

# Walter “Doc” McCrone

## 1916—2002

A pioneer in the science of chemical microscopy died in Chicago on July 10, 2002 at the age of 86.

Walter C. McCrone (1916 - 2002), the father of Modern Microscopy, revolutionized the use of and understanding of the light microscope for materials analysis, trained thousands of students worldwide in the use of microscopy, wrote hundreds of articles and books, gave thousands of presentations and lectures on microscopy, and developed numerous accessories, techniques, and methodologies to push the state-of-the-art in microscopy. He is better-known to the general public for his analytical work on the Shroud of Turin, the Vinland Map, and various other famous works of art and antiquities.

McCrone was, at the same time, a humanitarian extraordinaire. He served on the Board of Directors of Ada S. McKinley Community Services, Inc. since 1951 and as Board President from 1964 to 1995. The Agency, a not-for-profit human services organization, has 40 program locations, a staff of 560, an annual budget of \$40 million, and serves more than 15,000 clients annually throughout Chicago. In recognition of his many years of dedicated service to the Agency, in 1997 they dedicated their new facility in honor of Dr. McCrone, the *Walter C. McCrone Industries* facility. The facility houses 120 clients in its sheltered workshop program and provides intake, evaluation, and job placement for more than 1,000 program participants annually. He also served on the boards of VanderCook College of Music, Chicago and The Campbell Center for Historic Preservation Studies in Mt. Carroll, IL.

McCrone was born in Wilmington, Delaware on June 9, 1916. He grew up mainly in New York State and attended Cornell University where he completed his undergraduate degree in Chemistry in 1938 and was graduated with a Ph.D. in Organic Chemistry in 1942.

After two post-doc years at Cornell University, McCrone accepted a position as a chemist (microscopist and materials scientist) at Armour Research Foundation (now, IITRI) from 1944 through 1956 where he rose to become Assistant Chairman of the Chemistry and Chemical Engineering Department. In 1956, McCrone left the structured world of the University to become an independent consultant and, on April 1, 1956 he founded McCrone Associates, Inc., Chicago (now located in Westmont, IL) an analytical consulting firm that grew from a one man/one microscope consulting service to a world renowned materials science facility dedicated to microscopy, crystallography, and ultramicroanalysis, now serving more than 2000 clients each year.

In 1960, McCrone founded McCrone Research Institute, Chicago, a not-for-profit organization devoted to the teaching and research of light and electron microscopy. In its 42 years, the Institute has taught over 20,000 students in all facets of microscopy. The Institute remains a leading educational facil-

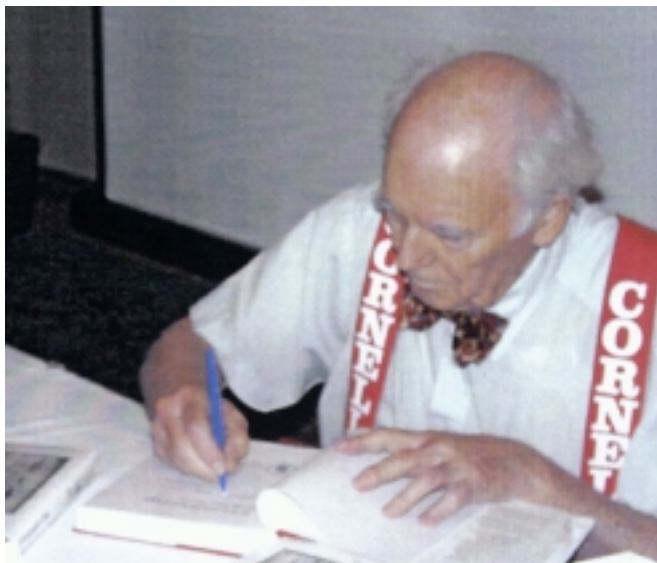
ity within the world of microscopy. As Director of the Chicago Institute, he expanded its activities to include McCrone Scientific, the sister organization in London, England.

Dr. McCrone was also the editor and publisher of *The Microscope*, an international journal started by Arthur Barron in 1937 and dedicated to the advancement of all forms of microscopy for the biologist, mineralogist, metallographer, and chemist. *The Microscope* publishes original, previously unpublished, works from the microscopical community and serves as the proceedings of the INTER/MICRO microscopy symposia held in Chicago each year. It emphasizes new advances in microscope design, new accessories, new techniques, and unique applications to the study of particles, fibers, films, or surfaces of any material whether inorganic, organic or biological.

During his 60-year career as a chemical microscopist, McCrone published more than 600 technical papers and 16 books and chapters. *The Particle Atlas*, his best known publication, written with other McCrone Associates staff members, appeared as a single volume in 1970 and as a six-volume second edition in 1973. Today, it is available on CD-ROM and is still recognized as one of the best handbooks available for solving materials analysis problems.

McCrone received worldwide attention and acclaim for his work with the Shroud of Turin Research Project in 1978. McCrone's contentious conclusion that the Turin Shroud is a medieval painting was subsequently vindicated by carbon-14 dating in 1988. In 2000 he received the American Chemical Society National Award in Analytical Chemistry for his work on the Turin Shroud and for his tireless patience in the defense of his work for nearly 20 years.

Throughout his remarkable and outstanding career as a pioneer in microscopy and microscopical techniques, McCrone received many other honors and awards. A few of these honors follow: in 1970, the Benedetti-Pichler award in microchemistry from the American Microchemical Society; in 1977 the Ernst Abbe Award of the New York Microscopical Society; in 1981



*Dr. McCrone signs copies of his book, Judgement Day for the Turin Shroud at the 1998 Fall CAC Seminar.*

the Anachem Award of the Association of Analytical Chemists; in 1982, the Certificate of Merit from the Forensic Science Foundation; in 1984, the Distinguished Service Award (Paul Kirk Award) of the Criminalistics Section of the American Academy of Forensic Sciences; in 1988, the Madden Distinguished Service Award, VanderCook College of Music; in 1990, the Irving Selikoff Award of the National Asbestos Council; in 1990, the Founder's Day Award and in 1991, the Roger Green Award of the California Association of Criminalists; in 1991, the Fortissimo Award, VanderCook College of Music; in 1993, the Public Affairs Award of the Chicago Section, American Chemical Society; in 1999, the Emile Chamot Award from the State Microscopical Society of Illinois, and just in June of 2002, he received

the August Köhler Award from the State Microscopical Society of Illinois and is the only person to have received both the Society's awards.

McCrone and his wife Lucy recently took advantage of the Cornell Campaign Challenge to complete funding for a professorship in the College of Arts and Sciences. Named the Emile M. Chamot Professorship in Chemistry, it honors Emile Monnin Chamot, a Cornell professor of chemical microscopy.

Walter McCrone is survived by his wife, Lucy, who is also an accomplished microscopist and has shared Walter's love of microscopy, working along side her husband for over 40 years.

## U P C O M I N G M E E T I N G S

Fall 2002—Dan Anderson, LA Coroner

Spring 2003—David Atkinson, Washoe County Sheriff

Fall 2003—San Diego Sheriff

Spring 2004—San Mateo Sheriff

Fall 2004—Ventura Co Sheriff

Spring 2005—Oakland PD

Fall 2005—LAPD

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# Fall Seminar Tentative Schedule



## Wednesday, October 16, 2002

7:00 Registration Opens  
8:00 Welcoming Remarks, Vendor Introduction  
8:45 Welcoming Remarks: Dr. Lakshmanan Sathyavagiswaran Chief Medical Examiner, LACDOC  
9:00 Bill Lockyer, California Attorney General  
9:30 Break – Vendor Exhibition  
10:00 CAC Historical Slide Show  
10:15 Words from the Charter Members  
12:00 Lunch – Poolside  
1:30 Case Study: Reed McLaughlin Jon Babicka, LAPD  
2:00 Case Study: Richard Ramirez “The Night Stalker” Detective Gil Carrillo, LASD  
3:00 Break – Vendor Exhibition  
3:30 Case Study Continued: Richard Ramirez Detective Gil Carrillo, LASD  
5:00 Wine and Cheese Reception Poolside  
7:00 New Member Reception Hospitality Suite  
7:30 Hospitality Suite open to ALL

## Thursday, October 17, 2002

7:00 Registration Opens  
8:00 Dennis Ward, FBI The Future of X-ray Analysis in Forensic Science  
9:00 Case Study: Various Laboratories

9:30 Break – Vendor Exhibition

10:00 Case Study: Carolyn Garnett San Diego Sheriff's Department

10:30 Case Study: Los Angeles County Dept. of Coroner

11:00 Case Study: Various Laboratories

11:30 Case Study: Various Laboratories

12:00 Lunch – Poolside

1:30 Animal Investigators—Arson/Bomb Detection, Narcotics Scent, Cadaver, & Search/Rescue

3:00 Break – Vendor Exhibition

3:30 Case Study: Various Laboratories

4:00 Case Study: Various Laboratories

4:30 Case Study: Various Laboratories

5:00 Case Study: Various Laboratories

6:00 Beach Bash Banquet

10:00 Hospitality Suite open to ALL

## Friday, October 18, 2002

7:00 Registration Opens

8:00 Business Meeting

9:30 Break

10:00 Technical Papers to be announced

12:00 Lunch

1:30 Technical Papers to be announced

3:30 ABC Examination



# Why I'm Glad That I Wasn't an Archaeologist

by Jim White

Recently, while perusing a copy of the *Economist* (April 20, 2002), I ran across the following letter to the editor. I have not read the article it refers to, but it is of interest, I feel, on its own merit. It comes from M. Coe of New Haven.

*SIR – Your article on the ethical problems facing archaeologists overlooks archaeology's dirty secret: the failure of field archaeologists to write up and publish fully in a timely fashion the results of their research. Digging, no matter how scientific, is by its nature destructive.*

*An archaeologist who neglects to publish a final report on a dig in a reasonable time is no more ethical (perhaps far less so) than an impoverished, third-world peasant looting the artifacts of his ancestors to support his family. Not one penny should go to any researcher until the results of his last big excavation are actually in print.*

Has not this been the constant criticism of the forensic science community? We do good work (we hope) and sometimes novel work, or we may work out some modification of an existing method that makes it more accurate, precise, sensitive, or specific. We may share these findings with our co-workers, but for the most part, they are not shared with the community by oral or written presentation. We go on to the next "dig," in our case, the next case, and this informative data remains buried in a case file while seminar program chairs are begging for meaningful material to have presented at their meetings.



**... this informative  
data remains buried  
in a case file while  
seminar program  
chairs are begging for  
meaningful material.**

That we apparently share this failing of reportage with the archaeologists is not the reason that I am glad that I did not choose that path. It lies in the sentence "Digging, no matter how scientific, is by its nature destructive." The archaeologist can have in her/his hand an artifact from a "case" and use the best analytical methods available to characterize that sample in order to add to our understanding of the historical record. But, in so doing, she/he must know that in 10, 20, or 50 years, tools will be available to obtain much more meaningful information from that item.

Thus the conundrum of archaeology: you can never test the items you recover. Or, one could argue, you should never dig, because collection and documentation methods will also improve with time. Fortunately for us in forensic science, we are forced to use the tools at hand because the damn case will be in trial next week.

While clearing out my files I found many examples of work done with tools or techniques that have long since been replaced by newer and better ways to answer the same forensic questions. Does this mean that we are doing better work? Not necessarily, but since we have these tools now, and we must do the examinations NOW, it is our ethical obligation to use them wisely and use them well, as we cannot wait for the next scientist with the better tool to extract more and better information from our evidence.

# ***Fire Investigations and the Forensic Lab: What the Lab Should be Doing, or, It's Not About the GC***

## **Introduction**

The forensic lab often represents the only source for reliable information on a wide variety of technical matters that a fire investigator can rely upon. There are numerous important questions as to what something is, what it is made of, what does it do, and how does it burn, for which there are no other places to turn for answers. These questions are unique to the fire investigator and go far beyond the analyzing of fire debris for volatiles. Without lab assistance, investigators can only speculate or guess, and that is dangerous ground. Not only does this open the door for errors and even miscarriages of justice, the trier of fact today requires demonstrable proof, not mere speculation. This is especially true in response to the Supreme Court decisions of the last ten years such as *Daubert*, *Benfield*, and *Kumho Tire*. Under these guidelines (and as expressed in Federal Rules of Evidence 702), it is no longer sufficient for an investigator to state a conclusion and have it accepted by the Court merely because of one's years of experience or because an "expert" has proclaimed it. Conclusions must be supported by proof of the adequacy and reliability of the data and the reasoning relied upon. It is surprising that simple concepts of control samples, documentation, reproducibility of results, and recognition and control of variables that scientists take for granted are not always well understood even by intelligent, capable investigators.

In the absence of reliable "good" scientific answers, investigators may turn to less reliable sources such as the oral history that permeates the expertise or older "traditional" texts prepared by experienced investigators of previous generations. Such sources are responsible for promulgating much of the mythology and misconception that exists about fires and their investigation. These include such commonly held concepts as:

1. Flammable liquid fires (or arson fires in general) are much hotter than "normal" fires, so finding proof of "abnormally" high temperatures is proof of an accelerated fire.
2. Incendiary fires are always "faster" than "normal" fires, so fires that are witnessed to be "very fast" have to be arson.
3. Incendiary fires are always more destructive than accidental fires, so completely gutted buildings are always the victims of arson.
4. All petroleum products are alike, behave the same, or are easily discriminated from background volatiles (whether the substrate is burned or not).



*John D. DeHaan, Ph.D., FABC  
Fire-Ex Forensics, Inc.  
3505 Sonoma Blvd. #20-314  
Vallejo CA 94590*

*Presented at the North-South Arson/  
Explosives Conference, Seaside, CA,  
July 2002.*

5. Detection of any concentration of flammable liquid is proof of arson.

6. The only thing that kills people in fires is carbon monoxide.

7. Burned areas of floors or carpets only occur with flammable liquids because fires burn upwards not downwards.

7a. Since #7 is true, the lab analysis of the burned carpet that reports no ignitable liquid residues has to be an error.

Knowledgeable crime lab personnel can disabuse investigators of some of these misconceptions and provide reliable answers and information. As professional criminalists, we must be aware of these needs and do what we can to respond.

## **What Services? What Answers?**

With the dramatic changes that have occurred in fabrics, furnishings, and other household materials in the last thirty years or so, the fire behavior of these materials has changed (in most cases for the worst). No longer are we surrounded by cotton, linen, or leather upholstery, over cotton or hair stuffing, on solid wood furnishings, with wool or nylon carpets, and wool or even fiberglass draperies, and painted plaster walls. Today's furnishings are comprised of synthetic fabrics, over polyurethane foam cushions, polypropylene carpets over urethane foam padding, wood composites, and thin wood paneling or fabric wall coverings. All of these materials will resist ignition by smoldering cigarettes, but are much more susceptible to ignition by a small open flame. Once alight, they will support very rapid flame spread and very large intense fires with smoke rich in pyrolysis products and dangerous gases. Today, before a fire investigator can assess what ignition sources are likely, and how fast the resulting fire will grow, he or she has to be able to distinguish between polyurethane foam and latex rubber foam, since one is readily ignitable by a dropped cigarette and the other is not. Is the plastic window panel made of Lexan or readily combustible polystyrene? Is the curtain made of cotton or rayon? One will readily spread fire, the other more reluctantly. The assessment of the fuel load normally found in a room is a critical step towards the reconstruction of a fire's progress by assessing whether the fire was "abnormally" intense or fast spreading. This assessment can lead to the conclusion that the "urethane bed acted as an accelerant," which is an abuse of the term "accelerant." An accelerant by definition is a fuel deliberately added to a scene to increase the intensity or speed of the spread of a fire. The nature of the "first fuel ignited" is similarly critical in evaluating whether a particular heat source could be responsible. Being able to have lab identification of that fuel would help in establishing a concrete starting point for the cause determination.

Another common problem is simply the identification of a melted or partially burned mass of material. The issue often is whether this mass of material is normal to the scene or represents something added in the way of additional fuel, e.g., Is that a child's toy innocently melted into the carpet or the plastic bottle used as an incendiary device? Is that a plastic light diffuser from a ceiling fixture or the remains of additional plastic added to fuel the deliberate fire? Other issues include determining what the melting point of that plastic or metal object was. Was the damage to it the result of normal fire progression in the room, or did it melt because fuel was in direct contact with it? Did it play a role in providing an accidental means of ignition or a "first fuel ignited?" What is the auto-ignition temperature or flame point of the material? Will it ignite at the

temperatures encountered in this environment normally? Is this a flammable liquid readily ignitable (by an arc or flame) at room temperature, or is it a combustible liquid that would require aerosolization, a wick, or elevated temperatures before it would ignite? These are the questions that the forensic lab can answer.

What was the physical form of the object before the fire? Careful examination using room light, UV, laser or alternate light sources may reveal fragments of tags, labels, or other identification marks. Was it a bottle, jar, or glass? How big was it and what was it originally used for? Was it broken by mechanical impact or thermal shock? The simple stereo microscopic examination of a flexible gas line may answer the critical questions of whether it was melted, corroded through, cut, or broken by mechanical action. Toolmarks or trace evidence transfers may reveal whether it was tampered with and with what kind of tool.

If the object in question was involved as a fuel, the question may be whether it burned by smoldering (glowing) processes, open flame, or both. This may hinge on whether the material was a thermoplastic or thermosetting plastic, or a char-forming solid. How much heat would it produce as it burned (and how fast would it burn)?

Many of the tests involved in such determinations are not governed by ASTM methods and are, instead, applications of sound scientific testing. These tests occur with such infrequency relative to paint, glass, or blood that they do not lend themselves to the development of formal written standard protocols. The professional criminalist must be prepared (and must be permitted) to apply reasonable, scientifically defensible methods to acquire useful, reliable information. The supervisory concept that: "If there is no approved protocol or standard method in place, then no test can be conducted" is nonsense. To claim that applying a match to a small quantity of unknown material to see how it ignites and burns is unreliable and invalid science is an insult to the scientific and professional standards of the criminalist. Many of these tests are simple and require no elaborate test apparatus. It could be argued that the investigator could do such tests. Considerations of test validity, reliability, and the influence of variables are second nature to a good scientist and investigators are often not aware of them.

Clothing items may have impact or transfer patterns that offer critical evidence towards a reconstruction or association. Clothing may be burned, scorched, or melted in such a way as to provide useful clues as to the position and posture of the wearer at the time of fire exposure. Thermal properties such as melting point, or whether the fabric could conduct heat, or allow penetration of infrared to induce burns to skin beneath without being damaged itself are amenable to lab testing. Tool and footwear impressions, trace evidence, fingerprints, glass fracture analysis, blood spatter, and even blood typing and DNA are all the province of the crime lab, and all have played critical roles in reconstructing fires and helping establish guilt or innocence. Leuco-crystal violet reagent for enhancing fingerprints in blood was shown to be very suitable for revealing blood spatters on various surfaces after soot and smoke deposits obscured them.

Chemical analysis for combustion products or residues of solid fuels goes far beyond GC analysis for volatiles, and may require SEM, EDX, IR, pyrolysis GC, or light microscopy. Where else would the investigator turn if not the crime lab? The nature of potentially toxic combustion products may also be the subject of lab testing. The nature of combustion products may be an important clue as to what the initial fuel was.

Styrene is an obvious residue of some synthetic materials, but the complex mixture of ketones and homologous series of aldehydes that arise from the combustion of bodies have been mistaken by less experienced examiners as an exotic accelerant.

One of the most significant areas in which the criminalist holds unique capabilities is the assessment of the evidential significance of traces and transfers. Criminalists have the training to recognize the significance of all types of evidence. This was brought home in a shocking fashion a few years ago during the aftermath of the Branch Davidian fire in Waco. A private-sector colleague had been entrusted with the analysis of debris samples recovered after canine searches of the main building. In discussing the accuracy of the canine alerts (about 80%), he inquired whether anyone had ever mentioned that camping fuel cans recovered from the site had been repeatedly punctured? Asked to describe the damage, he said that the cans had been repeatedly and intentionally punctured with a pocketknife or similar tool, making them into sieves for the rapid dispersal of their flammable contents. This had never been revealed during all the court proceedings and hearings. When asked why his reports had never mentioned this most important evidence of intentional self-immolation, he said he was just a chemist and not a criminalist, so therefore he wasn't really responsible for offering opinions on non-chemical evidence!

New techniques and materials are always being introduced for scene assessment, evidence collection, packaging, and analysis. Years ago, UV lamps were touted as the tool to reveal petroleum products in fire debris by their fluorescence, until it was shown that many pyrolysis products from carpets and pads also fluoresced. More recently "HazMat" absorption blankets were being promulgated among scene investigators until lab analysts managed to intercede and prove that the mats were often contaminated by exposure to volatile hydrocarbons from vehicular sources before their use. At the moment a new product, "Evidence Sampling Particulate," is being promoted to fire investigators as a sensitive absorbent that signals the presence of petroleum products by a color change.<sup>1</sup> Very little has been done to demonstrate the usefulness, reliability, or lack of interference of this product. It is properly the province of the criminalists (who will ultimately be left with analyzing and explaining this product) to evaluate it before it is widely used.

We have made great strides in improving the sensitivity of laboratory techniques in the last twenty years, especially in the area of GC analysis. This, combined with improvements in the isolation of volatiles from bulk fire debris, has made it possible to detect and identify volatiles down to sub-ppm levels. This sensitivity was thought to be an unalloyed advantage since many investigators were convinced that they had accelerated fires only to have the lab analysis come back negative (see #7a, above) due to lack of sensitivity. This boon did result in many more positive findings of volatiles in all manner of samples, and then it was noticed that the volatiles did not always occur in burned fire debris. In the last three years, it has been reported that identifiable petroleum products have been found in carpets, floor tiles, footwear, newspaper, magazines, new clothing, towels, and office products, albeit at very low concentrations in some cases.<sup>2</sup> It is now apparent that ultimate sensitivity is not always a blessing for arson investigation since petroleum products can be found as post-production residues in a wide variety of household and commercial products. One surprising result arose from the analysis of materials from a suspected arson fire that killed two people in Pennsylvania.

The investigators were convinced that the fire was arson (based on estimates of the rapid spread and intensity, and the presence of an "unusual" deep burn pattern that extended across the carpet in the room of origin). Lab analysis revealed no identifiable petroleum products in the carpet, its pad, or the layer of newspapers under the carpet pad. Frustrated investigators returned and sampled the unburned wood floor under the newspapers. They were rewarded with a positive result for highly evaporated gasoline. They explained away the absence of the same "accelerant" in the overlying carpet and pad by claiming the gasoline had been flushed from the carpet by all the water used in suppression. Defense experts questioned these conclusions and further inquiries revealed that the floor had been refinished some 10 or 15 years prior to the fire. The builder that did the work was located and he admitted that, at that time, since gasoline was much cheaper than thinner, it was often used to dilute the floor varnish for application. It seemed hard to believe that solvents used for finishes applied years previously could still be detectable, but subsequent testing has revealed that coating solvents do not all evaporate and residues are trapped in the matrix until released by heating (as in fire debris analysis).<sup>3</sup>

The issues of high sensitivity were an issue several years ago during the great canine debates. The remarkable sensitivity of trained canines to petroleum products often resulted in samples being recovered, which the lab methods in use at the time could not confirm. Despite their sensitivity, the canines could not demonstrate the selectivity that is necessary to discriminate between volatile residues of intentionally added accelerants and residues of innocent products such as insecticides, cleaning solvents, and adhesives. As a result, it was decided by professional consensus that a canine alert unconfirmed by proper laboratory analysis should not be considered to be a valid indication of the presence of an accelerant. This is an example of a lab service for which there is no substitute. There is no other means by which volatile traces of possible significance - gasoline, paint thinners and other accelerants - can be discriminated from volatiles incidental to the scene. The proliferation of non-distillate petroleum products for all kinds of uses has vastly complicated the identification or even characterization of volatile traces, since many of them do not have characteristic peak patterns. Odors, canines, and electronic sniffers

all have their uses as screening devices at fire scenes, but only GC techniques as described in ASTM E1387 or E1618, have the selectivity as well as the sensitivity. It is clear, however, that with the tremendous sensitivity of today's GC techniques, there is a responsibility for the criminalist to carefully assess the significance of trace levels of volatiles. In today's petroleum-based world, the mere presence of traces of thinners, solvents, or even gasoline is not of significance in proving an accelerant was used. Not that many years ago, the level of significance was on the order of 20 ppm. Any less than that, the signal was "down in the grass" of the GC signal and judged to be nonsignificant. With today's GC techniques the "grass" is considerably lower, far less than 1 ppm. The criminalist must carefully assess whether the detection of volatiles at those (or far lower) concentrations is significant or just background in a "contaminated" world. That is an important issue that should be addressed by research and technical working groups.

## Summary

In today's world of reduced service levels in many forensic labs and overwhelming caseloads, those who have maintained arson analysis services even in the face of cutbacks and general antipathy towards arson crimes are to be congratulated. Fires kill, injure, and cripple thousands of people each year and a fair percentage of those are fires set deliberately to achieve those ends. Arson is not just a property crime; it is very often a crime against persons. As such, it deserves the best of investigation. Criminalists offer services to fire investigators that are not available anywhere else, and it is up to us to ensure that those services are always offered as accurately as possible and in a timely fashion.

1 "The Evidence Sampling Particulate," John H. Woodland, Fire Analysis & Technology, *Fire & Arson Investigator* (CCAI), March 2002, p. 5.

2 "The Petroleum-Laced Background," John Lentini, Julia Dolan, Cheryl Cherry, *J For Sci* 45(5), 2000, pp. 968-989.

3 "Persistence of Floor Coating Solvents," John Lentini, *J For Sci* 46(6), 2001, pp. 1470-1473.

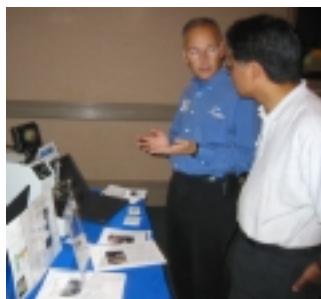
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## The Second Annual Joint Meeting...

...of the northern and southern California Arson Analysts drew an eager crowd of about 20 in beautiful Monterey. Highlighting the July 25th dinner meeting was guest speaker John DeHaan, who gave a brief recap of the events at the CCAI live burn testing performed earlier in the week. Following in John's shoes the following day were speakers from

San Diego, LAPD, Lawrence Livermore University, DOJ-Sacramento, Agilent Technologies, Farmer's Insurance and Restek.

As always, the meeting's success was funded by a variety of generous vendors, some of whom were able to exhibit during the meeting. Appropriately, door prizes included DeHaan's newest edition of Kirk's Fire Investigation, Wambaugh's novel, *Fire Lover*, and several delicious varieties of some favorite "flammable liquids."





**2001 Year End Summary**  
**A. Reed & Virginia McLaughlin Endowment Fund**  
Paine Webber Business Services Account

<u>Activity Highlights</u>	<u>Year to Date</u>
Deposits	20,219.69
Money Fund Checks Paid	-51,964.06
Business Services Account Fee	-125.00
Loan payment interest charged	-803.45
Professional Mngmt Fee	-5,958.90
Misc Charges	-15.00
Net Change	-38,646.72

<u>Earnings Summary</u>	<u>Paid in 2001</u>
Money Fund Dividends	3,481.06
Other Dividends	16,494.33
Interest	16,657.52
Plus non-municipal accrued interest rcvd.	585.94
Less non-municipal accrued interest pd.	-120.83
Other	3,195.63
Total year 2001 security earnings	40,293.65
Prior year's entries and adjustments	177.16
Net Security Earnings	40,470.81
Return of Capital/Principal	103,524.21

<u>Portfolio Summary</u>	<u>Year to Date</u>
Opening Value	1,230,542.51
Net Change From Activity Highlights	-38,646.72
Net Security Earnings	40,470.81
Change in value of investments	-204,079.32
Value on Dec. 31, 2001	1,028,287.28

**Fiscal Year End Summary (July 1, 2001 – June 30, 2002)**  
**Ed Rhodes III Endowment Fund**

Value 7/1/01	24,280.46
<u>Donation (Jan '02)</u>	
Jennifer Mihalovich	200.00
<u>Check Paid (Mar '02)</u>	
Ed Rhodes Award	-500.00
Change in value of investments	-3,142.22
Value 6/30/02	20,838.24

\*Endowment Fund financial summaries are reported annually.  
If interim, or more detailed information is desired, please contact  
the Treasurer at [mjf@forensica.com](mailto:mjf@forensica.com) or 510-887-8828.

# Financial Report

## General Association Account

### Fiscal Year Account Balances July 1, 2001 to June 30, 2002

Michelle JoAnne Fox, CAC-Treasuer

#### Cash Balance July 1, 2001

\$ 76,514.63

#### INCOME

Interest - CD	\$ 1,017.41	
Interest - Money Market	\$ 551.40	
Membership Applications	\$ 6,075.00	
Membership Dues	\$ 43,110.00	
Newsletter Advertising	\$ 250.00	
Newsletter Subscriptions	\$ 164.00	
Dinner Meetings Income	\$ 933.32	
Reimb from Endow for taxes	\$ 4,360.00	
Reimb Misc	\$ 528.50	
Fall '00 Sem Reimb. for pymnt to hotel	\$ 1,500.00	
Seminar Income (Fall '00 & Sp '01)	\$ 16,240.13	
Seminar Income (transfer to seminar acct)	<u>\$ 30,538.35</u>	
Total income	\$105,268.11	\$ 105,268.11

#### EXPENSES

ABC Support	\$ 2,499.81	
Awards	\$ 2,621.96	
Bank Fees	\$ 2,389.99	
Web Site Consultation	\$ 2,015.00	
Journal	\$ 15,303.42	
Meetings	\$ 919.39	
Postage	\$ 386.34	
Printing	\$ 17,384.48	
Misc	\$ 70.00	
Seminar May '02 (credit for double chge)	\$ 280.00	
Seminar Oct '02 (bags)	\$ 1,578.88	
Transfer to Seminar Accts	\$ 31,675.00	
Seminar Oct '01 loss	\$ 1,540.69	
Supplies	\$ 3,727.22	
Taxes/Consult/Gov't Fee	\$ 2,302.00	
Travel	\$ 5,796.55	
Total Expenses	<u>\$ 90,490.73</u>	\$ (90,490.73)

Income Less Expense = \$ 14,777.38

#### Cash Balance June 30, 2002

\$ 91,292.01

Cash on hand 6/30/02	
Savings	\$ 29,745.03
Checking	\$ 3,777.25
Combined CD Values	\$ 43,469.73
Seminar 1 Checking	\$ 2,000.00
Seminar 2 Checking	\$ 2,000.00
Fall 01 seminar	
May '02 Seed	\$ 10,000.00
May '03 Seed	<u>\$ 300.00</u>
	\$ 91,292.01
	<u>\$ (0.00)</u>

## Biological Evidence as Trace Evidence: The Forensic Science of DNA Typing

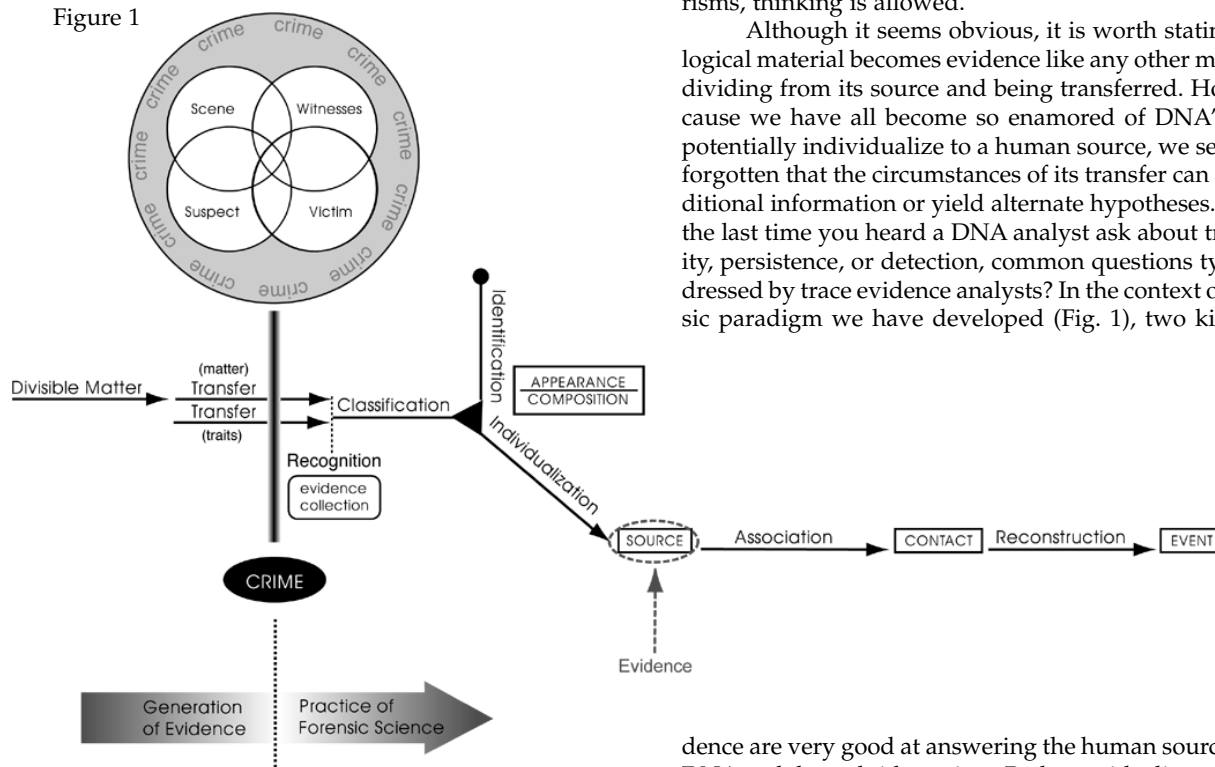


Just as the leavings of a meal – the plates, glasses, and utensils as well as the crumbs and rings of liquid – give clues about what was eaten and who ate it, physical evidence at the scene of a crime holds information about what happened there. While the passive, non-sentient mechanism of transfer works the same way, regardless of the nature of the material, biological and non-biological evidence have come to be seen as two completely different entities. This derives both from how they are analyzed in the laboratory and the different questions they

“generalist.” We concluded in that conversation, that the difference was not so much in the “doing,” but in the “thinking.” While nobody today expects a criminalist to be technically proficient at analyzing a wide spectrum of evidence, we (and we hope you) are convinced that the competent professional must understand the basic principles of criminalistics and be conversant in disciplines outside his specialty. In particular we differentiated a scientist (or criminalist or analyst) from a technician by her ability to frame questions and interpret evidence in the context of the case. To repeat one of our favorite aphorisms, thinking is allowed.

Although it seems obvious, it is worth stating that biological material becomes evidence like any other material—by dividing from its source and being transferred. However, because we have all become so enamored of DNA’s ability to potentially individualize to a human source, we seem to have forgotten that the circumstances of its transfer can contain additional information or yield alternate hypotheses. When was the last time you heard a DNA analyst ask about transferability, persistence, or detection, common questions typically addressed by trace evidence analysts? In the context of the forensic paradigm we have developed (Fig. 1), two kinds of evi-

Figure 1

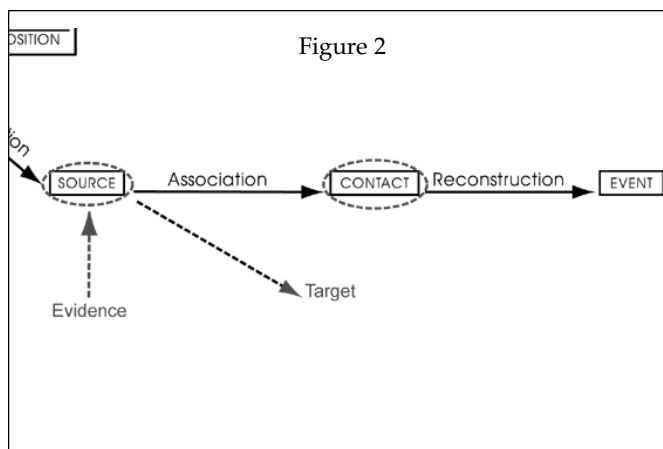


are able to answer. In line with the theme of the Spring, 2002 CAC meeting in San Francisco, *Bridging the Forensic Disciplines*, Norah presented a paper in which she examined biological evidence as just another form of classical trace evidence. Because various summer plans have interfered with our lunch schedule and this topic was in line with our continuing thesis of exploring unifying principles of forensic science, we decided a recap was in order.

We begin by reviewing an idea we explored in a previous POL column (Rudin and Inman, 2002). In that column, we talked about the continuing debate of the forensic “specialist” vs. the

dence are very good at answering the human source question, DNA and dermal ridge prints. Both provide direct evidence to a person and can potentially individualize. However, source, biological or otherwise, is not always the relevant or only question. In Keith’s words, if you don’t ask the right question, you will not get the right answer, regardless of the brilliance of your analysis.

The power of DNA to individualize masks the importance of other, sometimes more relevant, questions. In fact, the more salient legal question is whether contact has occurred between people or objects during the crime event. In our paradigm (Fig. 2), contact links a “source” to a “target.” In a similar scheme proposed by our colleagues across the pond, this concept is described as a 2<sup>nd</sup> level proposition regarding “activity”



(Cook et al, 1998, 1999). Nonbiological trace evidence has historically recognized the importance of establishing contact, in part because individualization to source is rarely possible. Because biological evidence is frequently shed during violent crimes, the inference of contact between the source of the biological evidence and a target is a rapid logical leap once the source is established. However, it must not be forgotten that establishing contact between the items or people during the crime event is most relevant to a legal proceeding, and establishing source serves merely as a prelude to that determination. Therefore, trace evidence teaches us that the answer to “who?”, or more properly, “source,” is merely an answer, not The Answer.

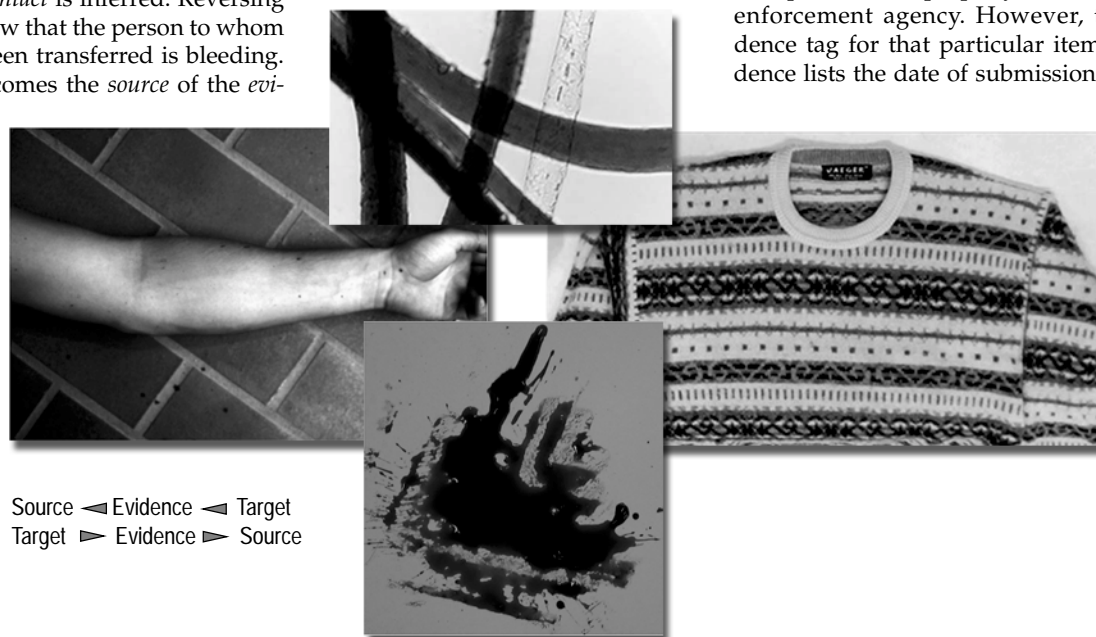
To illustrate the concept of contact as linking a source to a target, we refer to our commonly used example of the sweater and the person (Fig. 3). Assume there exists a sweater from which some fibers are transferred to another person. The fibers are divided from the sweater and, during contact with another person, a divided fiber is transferred to the other individual. Later examination of the individual uncovers this fiber, which is collected as evidence. When the evidence fiber can be identified as coming from the reference sweater in question, the *source* (sweater) has been linked to the *target* (the person), and *contact* is inferred. Reversing this, assume now that the person to whom the fiber has been transferred is bleeding. The person becomes the *source* of the *evidence* (blood), which is then transferred through some action to the *target* (sweater). Individualizing the blood to the person infers contact between the person and the sweater.

Thus, even when you think you are only answering “who” or “what”, ultimately, the evidence connects the source with a target. In a very typical laboratory example, even semen on a vaginal swab connects two people, the victim and the semen donor. In the case of an “intimate” sample, the inference of contact is usually left both unspoken and undisputed; it is difficult to imagine an alternative hypothesis for how the semen came to be there. Because of this, however, DNA analysis has single-handedly reinvented the consent defense.

Coming from another angle, these ideas can be viewed in the framework of the common questions that may be asked in any case investigation, “why,” “when,” “who,” “what,” “how,” and “where.” The examination of physical evidence can never answer “why” and can rarely shed light on “when.” “Who” and “what” ask about the relationship of evidence to a source, respectively biological or nonbiological. Because human source established by DNA analysis is now frequently accepted as fact, the legal questions revert to those classically raised by nonbiological trace evidence, “where” has it been and “how” did it get there, questions about contact between a source and a target. And because DNA evidence is typically understood as evidence-to-source, many analysts are ill equipped to consider alternate hypotheses of contact, and most laboratory reports on DNA analysis reflect this limited perspective of the problem.

Norah has noticed in her private practice that two categories of questions are more and more often being asked by opposing counsel. The “where” question is most often translated as chain of custody. This is most effective in older cases that do not meet current standards of documentation or in which holes may have developed over time. In one example, after a neat and tidy DNA analysis that linked key biological evidence to a suspect, it was discovered that no documentation existed of the collection of the reference sample from the suspect. When informed of this, the detective said that he would take care of it and promptly wrote a report based on his recollection of the event. He indicated that the sample from the suspect was collected on June 26, 1997, and transported to the property room of his law enforcement agency. However, the evidence tag for that particular item of evidence lists the date of submission as June

Figure 3





12 of 1997. Because it is hard to imagine how one could collect the sample 14 days after it had been submitted to the property room, this evidence and the resulting analyses were suppressed at trial and the jury never heard of the DNA results.

More interesting from a forensic point of view are various alternative hypotheses for "how" a particular DNA type came to be at the location where it was detected. An initial consideration suggests four different categories of transfer:

- Explainable*. An example of this would be consensual sex. Sure, my semen was there, she is my wife and we had sex last night. The more classical form of this is, of course, latent prints. Sure, my prints were on the doorframe because I made a delivery last week. They have nothing to do with the murder that was committed yesterday. It is interesting to note that time is often a factor in explaining why evidence is present, but not related to the crime event.

- Coincidental*. The obvious example of this would be two people with the same genetic type. The type detected is correct, but it is from someone other than me who just happens to have the same type. The rareness of single-source profiles detected with current technology virtually negates this argument, even for close siblings. However, for mixtures and partial profiles, legitimate questions remain.

- Malicious*. When all other avenues have been exhausted, a frequent explanation by the accused for why his biological material was found at the scene of a crime is that it was planted by someone wanting to frame him for the crime. Norah often receives inquiries from attorneys asking her if she can tell if evidence was manipulated, either at the scene or in the lab. Unfortunately, biological evidence usually looks the same regardless of whether the evidence got there legitimately, accidentally, or through malicious action.

- Accidental*. It is the accidental presence of physiological material that emphasizes biological evidence as merely a subset of classical trace evidence. In this we distinguish the strength of the match (its rarity) from its significance to the crime event (its relevance). This is where the nature of the evidence, and its properties of transfer, persistence, and detection come into play. The most virulent example of accidental presence is contamination. We define contamination as the adventitious deposit of material after the evidence is collected by responsible personnel. Of greatest concern to the legal system is contamination of an evidence sample with the reference sample from a suspect, as this would generate a false positive conclusion. As techniques become ever more sensitive, laboratory contamination, and its prevention and detection, become more prominent issues.

The value of DNA as trace evidence varies according to the type of biological material in question and for each, special concerns exist.

- Hair*. The same transfer properties that plague microscopic hair comparison apply to hair that is analyzed genetically. All of us continually shed body and head hair, and these hairs move easily around the environment. Hairs with sheath material, indicating possible violent removal, or pubic hairs, which should ordinarily be contained by clothing, are more likely to be related to a crime event.

- Blood*. Because blood is more likely to be indicative of violence, its presence (hence its donor) at the scene of a crime logically takes on increased significance.

- Semen*. Because semen production is usually voluntary and intentional, its presence is the hardest to explain as accidental. Hence the default to the consensual explanation mentioned earlier

- Saliva*. Next to hair, saliva is one of the easiest physiological materials to transfer accidentally. It may account for many instances of laboratory contamination.

- Surface cells*. Surface cells, or cells brought to the surface through sweat or sebaceous glands, pose one of the biggest challenges in forensic DNA typing today. Studies have shown that current PCR techniques are not only sensitive enough to type cells left at points of contact and through habitual wear, but cells left by casual contact and even by secondary transfer. (Van Oorschot, 1997; Ladd et. al, 1999) Low copy number techniques (Gill, 2001), which increase the sensitivity even more, call into greater question the significance of any results. If we don't know the biological source of the cells that gave the type, of what significance to the case is identifying their donor? These are questions that will need to be addressed by the community in the near future.

A case example illustrates this concept. On a knife that was allegedly used in a murder, no blood was detected, either on the blade or on the handle. However, the laboratory elected to swab the blade anyway, and found the victim's DNA type there. No genetic material from the suspect was found, either on the handle or the blade. What does this evidence mean in the context of the case? First of all the knife fails to connect the suspect and victim. Second, the failure to detect blood weakens the finding of the victim's type. However, that it was found on the business end strengthens the inference that it got there through violent activity.

In another case, a knit ski mask was recovered from the floor of the suspect's residence. Its torn and dirty condition suggested that it was one of two masks used in an armed robbery; however, no blood was detected on it. The suspect's roommate was one of the perpetrators and was killed at the scene by one of the victims. A hair found in the mask showed the same DNA type as the suspect. However, samples swabbed from contact points revealed an unknown male type. It is no surprise that a single hair from the suspect would be found in a knit cap found on the floor or his residence. To most criminalists this would not be convincing evidence that the suspect necessarily wore that hat during the crime. In addition, the finding of a foreign type on the hat itself suggests that the habitual or most recent wearer was someone other than the suspect.

Going back to our roots and realizing that biological evidence easily fits into the framework established by classical trace evidence helps us define the relevant questions in a case. This is particularly useful when source is no longer the question. The forensic paradigm can help structure that inquiry.

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**President:**  
**Michael J. Parigian**



Ventura Co. Sheriff  
800 S. Victoria Ave.  
Ventura, CA 93009  
(805) 654-2333  
michael.parigian@mail.co.ventura.ca.us

**President-Elect:**  
**Raymond Davis**



Quantum Communications  
4 Exeter Ave.  
San Carlos, CA 94070  
(650) 802-0931  
rjdcourtskills@aol.com

**Recording Secretary:**  
**Brooke Barloewen**



Santa Clara Co. Crime Lab  
1557 Berger Dr. B-2  
San Jose, CA 95112  
(408) 299-2224  
bbar@crime.lab.co.santa-clara.ca.us

**Treasurer:**  
**Michelle J. Fox**



Forensic Analytical  
3777 Depot Road Suite 409  
Hayward, CA 94545  
(510) 887-8828  
mjf@forensica.com

**Regional Director: (North)**  
**Linda Jacobson**



Forensic Analytical  
3777 Depot Road Suite 409  
Hayward, CA 94545  
(510) 887-8828  
ljacob@forensica.com

**Regional Director: (South)**  
**Marianne Stam**



CA Dept of Justice Riverside  
1500 Castellano Road  
Riverside, CA 92509  
(909) 782-4170  
stamm@hdcdojnet.state.ca.us

**Membership Secretary:**  
**Elissa Mayo-Thompson**



Calif. Dept. of Justice- Riverside  
1500 Castellano Road  
Riverside, CA 92509  
(909) 361-5000  
elissa.mayo@doj.ca.gov

**Editorial Secretary:**  
**John Simms**



San Diego Police Dept.  
1401 Broadway MS 725  
San Diego, CA 92101  
(619) 531-2577  
vis@pd.sannet.gov

**Immediate Past President:**  
**Daniel Gregonis**

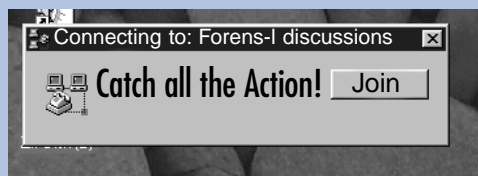


San Bernardino Sheriff's Dept.  
Scientific Investigations Div.  
200 South Lena Road  
San Bernardino, CA 92415-0056  
(909) 387-2200  
dgregonis@sanbernardinosherriff.org



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### New Element Discovered

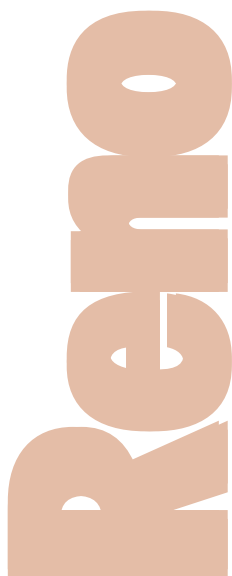
*Administratium.* A major research institution has recently announced the discovery of the heaviest element yet known to science. The new element has tentatively been named "Administratium." Administratium has 1 neutron, 12 assistant neutrons, 75 deputy neutrons, and 111 assistant deputy neutrons, giving it an atomic mass of 312. These 312 particles are held together by a force called morons, which are surrounded by vast quantities of lepton-like particles called peons. Since Administratium has no electrons, it is inert. However, it can be detected as it impedes every reaction with which it comes into contact. A minute amount of Administratium causes one reaction to take over 4 days to complete when it would normally take only a few minutes. Administratium has a normal half-life of 3 years; it does not decay, but rather undergoes a reorganization, in which a portion of the assistant neutrons and deputy neutrons and assistant deputy neutrons exchange places, with additional peons being added. Administratium's mass will actually increase over time, since each reorganization causes some morons to become neutrons forming isodopes. This characteristic of moron-promotion leads scientists to speculate that Administratium is formed whenever morons reach a certain quantity in concentration. This hypothetical quantity is referred to as...."Critical Morass." You will know it when you see it.

### Two New Additions to the Periodic Table

Element Name: WOMANIUM Symbol: WO Atomic Weight: (don't even go there) Physical Properties: Gener-

ally soft and round in form. Boils at nothing and may freeze any time. Melts when treated properly. Becomes very bitter if not used well. Chemical Properties: Very active and often highly unstable. Possesses a strong affinity for gold, silver, platinum and precious minerals. Violent when left alone. Able to absorb great amounts of exotic food. Turns slightly green when placed next to a 'better' specimen. Usage: Highly ornamental. An extremely good catalyst for dispersion of wealth. Probably the most powerful income-reducing agent known. CAUTION: Highly explosive in inexperienced hands!!!

Element Name: MANIUM Symbol: XY Atomic Weight: 180 +/- 50 Physical Properties: Solid at room temperature, but gets bent out of shape easily. Fairly dense and sometimes flaky. Difficult to find a 'pure' sample. Due to rust, aging samples are unable to conduct electricity as easily as young samples. Chemical Properties: Attempts to bond with any WO any chance it can get. This bonding is exponentially catalyzed in the presence of ethyl alcohol. Also, tends to form strong bonds with itself. Becomes explosive when mixed with KD (Element - CHILDIUM) for prolonged period of time. Amazingly, one may neutralize this affect by saturating with ethyl alcohol. Usage: None known. Possibly good methane source. Good samples are able to produce large quantities of methane by two methods on command. CAUTION: In the absence of WO, this element rapidly decomposes and begins to smell.



## California Association of Criminalists

Joint meeting with

Northwest Association of Forensic Scientists

April 7-11, 2003

El Dorado Hotel, Reno, NV

For information, contact Suzanne Harmon

775.328.2811 [sharmon@mail.co.washoe.nv.us](mailto:sharmon@mail.co.washoe.nv.us)

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