The CAC News

News of the California Association of Criminalists • First Quarter 2002

The President's Desk

Observations

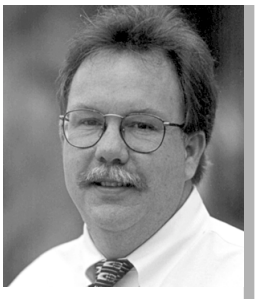
HOLLYWOOD!!! It's not just a line from a movie (*1941*) starring John Belushi, but a great place to have a meeting too. The 98th CAC Semi-Annual Seminar was a big success due to the hard work of the Los Angeles County Sheriff's Department. Dean Gialamas did a great job in negotiations for the hotel accommodations at Universal City (if you ever buy a used car bring him along) making our stay relatively inexpensive yet still luxurious. The meeting started with workshops on Wednesday and continued with a panel discussion on crime scenes, then paper presentations Thursday through Saturday. Friday also included one of the more unique CAC banquets I've attended, held next to a bunch of dinosaurs at the Universal Studios Jurassic Park ride. I'd like to thank Dean and his staff for all of the hard and tedious work needed to put on such a great seminar.

One of the interesting things that occurred during the panel discussion on crime scenes was one attorney's reluctance to use the word criminalist during her presentation and discussion. When she did, it seemed that she was intentionally minimizing the importance of the word. Perhaps this was accidental. Perhaps it was intentional. Attorneys that use words for a living, especially experienced trial attorneys, should be well aware of their meaning and impact. I concur with Marianne Stam who said during the introduction of her paper concerning a crime scene and laboratory investigation of soils, that she is proud to be a criminalist. She obviously said this with full knowledge of what a criminalist is and does. Maybe criminalists and criminalistics laboratories have an image problem.

With the exception of a few notable and possibly notorious individuals, criminalists are not self-promoting. Ours is a profession that generally works in the background with relatively little media attention. However, an attorney would be hard pressed to put on a trial of most serious cases without some forensic laboratory analysis. Whether it is a blood alcohol result in a drunk driving case, a narcotics report in a possession for sales case, or a DNA identity in a rape or homicide, the role of forensic science has become very important to the criminal justice system.

With the use of new technology and databases such as CODIS in DNA, AFIS for fingerprints and Drug Fire for firearms identification, forensic science has an opportunity to become even more proactive in helping to solve crimes and exonerate the innocent. Television shows such as CSI depict criminalists in a much more proactive role, much of which is fictitious and improbable. Even so, I like the idea of an experienced and properly trained criminalist having the time to perform a true scientific investigation of a crime. Manpower, facilities, and training are needed in order for crime labs to be able to take a more proactive role such as working suspect less crimes (as is being done with the DNA Cold Hit program).

We've seen tremendous growth in some areas of the laboratory, such as in DNA. Unfortunately, this has been, for some labs, at the expense of other areas (such as trace evidence). In order to secure the resources necessary to offer a full service laboratory it is important to promote our laboratory, profession, and ourselves. Criminalistics is a valuable asset that the public needs and deserves. Management has an obligation to convince their superiors, the ones making the monetary decisions, that the crime lab should be a primary focus for development and growth. The analyst, even the specialist, has an obligation to become educated in all areas of criminalistics so that they may be a more valuable resource in an investigation. With tight budgets, we all need to let people know what we have done and can do for them. We need to let the attorneys, the public, and police agencies know what a criminalist is.



Daniel J. Gregonis
CAC President

With the exception of a few notable and possibly notorious individuals, criminalists are not self-promoting.

The CACNews
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First Quarter 2002

On the cover...
During the recent CAC seminar, the Los Angeles County Coroner's lab was the site of a workshop on collecting evidence of sexual assault. Steve Dowell shows attendees a reconstructed human skull recovered from a construction site.

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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 to see what is offered. Content changes periodically, so visit often!

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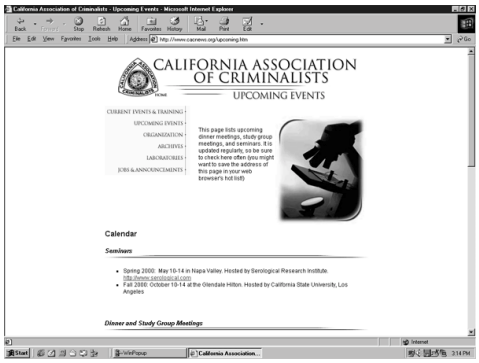
The CAC web site update

Two main goals I had before volunteering for web duty were to provide consistent updates for meetings and to disseminate info from studies and research. The motivation was primarily to provide another way, in addition to the CAC News, for members and prospects to see what was happening and perhaps promote interest. We're a large organization and the internet provides us a way to have us available (what we're about, what we do) to anybody, 24/7.



There is still more to the CAC than most members know and I hope the web site helps members and others see what we have to offer. The more our own members know what's going on, the more our resources will be used for their intended purpose. The more non-members see what we have to offer, the more talented young people will want to join and hopefully contribute to the CAC and the field of criminalistics. I know there is interest in our field as the site has been visited 10000 times in 2000 and it looks like it will be an additional 20000 for 2001. There is obviously much interest in our field from non-CAC members.

Recently, I was given a program that allows me to make changes to the web site without the help of our hosts. This will allow changes to be made more quickly, and save the CAC money. The accuracy of the information I post is a function of what I get from members, so unless the mistake is obvious, what I get is what gets posted. After making changes, I verify the results on two different computers. We still have a few glitches, such as some people unable to view Word documents from the web site because they have WordPerfect as well as some e-mail difficulties not related to the web site. I'll admit to being a nerd but am not much of a computer nerd, so I'm learning as I go.

There has been some concern about a password-protected database that we have on the web site. The reason for such a database is to allow some of our officers to access and update the most current version of our membership database. Since the officers requiring access live and work in different cities, having it on the web site is the logical solution. Since the database is on a different server than the site, and because the password is complex, I've been assured the possibility for hacking is very low and concern is not warranted. Several people have indicated a member directory, such as the paper version we send to members, would be helpful, and I agree, but many members would rather not have their names and work addresses posted for the world to see (Surprise! It's already listed on the ABC site if you passed the test). A password-protected version was considered, but wasn't sufficient, then an ever-changing-password version. It began to take on the shape of a monster and like most government projects, lost sight of what the goal was – a simple phone directory, where, within a few seconds, you could find Joe's number. Nobody loves trees more than me but in this case, use the paper version to look up Joe. When you eventually toss it, use the recycle bin.

Regarding the second goal, disseminating research, I've fallen short and must ask for help. I feel this is a great opportunity to share our research and new ideas with the world. The idea is to post meeting abstracts, research projects funded by the CAC, and other new and interesting ideas on the site. Since I'm not doing much research myself, I depend on those of you who are. Consider posting your ideas and research on our site. You'll have a much larger audience and what you present could generate further ideas, possibly from around the world.

As always, Please let me know if there are any errors or updates that need posting. I hope all of you find our web site useful.

—Mark Traughber

Kevin Andera (l) receives the Paul Kirk Award from CAC President Dan Gregonis at the recent fall seminar.

CAC Southern Region

Luncheon/Study Group Report

The southern region's CAC luncheon and study group meeting was on September 26th and was hosted by the Ventura County sheriff's laboratory. Over fifty people attended the luncheon at the China Dynasty restaurant to hear Ventura County Chief Medical Examiner Dr. Ronald O'Halloran, speak about the crash of Alaska flight 261. Attendees also enjoyed the good and abundant food. The crime scene, blood alcohol, trace, and drug study groups also met. The turnout was excellent for the meetings.

International Meeting in Australia

The Australian and New Zealand Forensic Science Society (ACT Branch) is hosting the 16th International Symposium on the Forensic Sciences in Canberra, Australia. The dates are 13-17 May, 2002. For further information, visit the web site at www.nifs.com.au/ANZFSS/Symposium2002.html.

Utah Criminalist Job Opening

The Utah Department of Public Safety is looking for quali-

fied applicants to fill the positions of Criminalist I / II. (DNA Analyst - 1 position) (Chemist - 1 position). Please go to http://www.cl.state.ut.us/crim.html for the complete posting.

Army Crime Lab Job in Atlanta

FYI, This is an advertisement for a Quality Manager position with the Army Crime Lab (Atlanta, GA). Any one of the three backgrounds (biologist, chemist, or physical scientist) will meet the qualifications; one position to be filled. Lynn Henson, US Army Criminal Investigation Laboratory, 4553 N 2ND Street, Forest Park, GA 30297-5122, email - hensonl@usacil-acirs.army.mil.

IAFS Meeting in France

The 16th meeting of the International Association of Forensic Sciences, September 2 to 7, 2002 will be held in Montpellier, France next year. The Call for Papers of the IAFS 2002 thematic sessions will be available from November 12, on the meeting's website **www.iafs2002.com**. Planned are - Plenaries, Continuous education, Special sessions, Breakfast seminars, Round tables, Workshops. Professor Eric BACCINO, IAFS President, ***IAFS 2002 Scientific Secretariat,*** SOCIETE INTERNATIONALE DE CONGRES ET SERVICES, 337, rue de la Combe Caude, 34090 MONTPELLIER - France, Phone : +33 (0)4 67 63 53 40, Fax : +33 (0)4 67 41 94 27, E-mail : algcsi@mnet.fr.

Excerpts from the October CAC E-News Update

The CAC would like to extend its condolences to the families affected by the 9/11/01 tragedies. We would also like to extend our support to those members who have been called up to active military duty and those participating in the investigations.

New Members Welcomed

Congratulations to our newest members approved at the October seminar: **Provisional:** Jeremiah Garrido, Santa Clara Co. DA, Diana Grappasonno, Santa Clara Co. DA, Jennifer Zawacki, Santa Clara Co. DA, Gentry Roth, Santa Clara Co. DA, Nicole Inacio, DOJ Berkeley, Lily Huang, DOJ Berkeley, Annette Klewietdejonge, DOJ Berkeley, Berhanu Temesgen, DOJ Berkeley, Meg Aceves, DOJ Berkeley, Deborah Enns, DOJ Eureka, Valerie Bernardi, Fresno County Sheriff, Erik Randich, Forensic Materials International, Thomas Dickan, Orange County Sheriff, Dana Castro, San Diego Co. Sheriff, Michelle Hassler, San Diego Co. Sheriff, Marissa Ochoa, San Diego Co. Sheriff, Henry Tuazon, Los Angeles PD, Alice Neumann, SERI, Mark Eastman, Sacramento Co. DA, Eucen Fu, LA Coroner, Rick Lute, ATF. **Affiliate:** Arleen Lim, San Diego PD intern, Meghan Mannion, UC Davis undergraduate student, Michelle Woods, Cal State LA undergraduate student, Lawrence Hanna, Cal State LA graduate student.

The following members applied for and were elected to full member status: Kimberly Kebojek Yoder, Phoenix PD, Jorge Pena, San Diego Co. Sheriff, Celia Lukomski, San Diego Co. Sheriff, Mel Kong, San Diego PD, Mike Grubb, San Diego PD, Jack Wallace, Ventura Co. Sheriff, Joshua Mateo, Ventura Co. Sheriff, Dawn Sorenson, NCISRFL, Bina Nandi, Orange Co. Sheriff, Michelle Stevens, Orange Co. Sheriff, Brenda Smith, Kern Co. Regional Crime Lab, Rod Andrus, DOJ Fresno, Meghan Kinney, DOJ Freedom, Adam Lutz, DOJ Freedom, James Hamiel, DOJ Central Valley, Gina Williams, DOJ Riverside, William Haynes, DOJ Berkeley, Tom Fedor, DOJ Berkeley, Rhonda Weiss, Santa Clara Co. DA, Jean Arase, Santa Clara Co. DA, Eric Collins, Alameda Co. Sheriff, Cindy Lewis, Alameda Co. Sheriff, Todd Weller, Oakland PD, Susan Molloy, Alameda Co. Sheriff, Alice King, Santa Clara Co. DA, Bradley Cooper, ATF San Francisco, Angel Moore, DOJ Berkeley, Dianne Burns, DOJ Berkeley, Bill Daher, Orange County SO, Jennie Thomas, DOJ Ripon.

Potential Fire Hazard:

One of our criminalists prepared some fluorescein reagent on a Friday evening. She cleaned up some spilled zinc mixture with some paper towels and discarded them in a plastic trash receptacle in the trace evidence laboratory. The following Monday morning, a spent ni-cad battery from a rechargeable flashlight was thrown on top of the zinc/paper towel material. Approximately 45 minutes later a fire erupted in the laboratory.

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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 the Training and Resources Committee Co-Chair Patricia Lough at 619-531-2460 or email pkl@pd.sannet.gov to get involved!

Our own Dr. John Dehaan explains the mystery of Spontaneous Human Combustion on a recent Discovery Channel *program of the same name.*

Pay It Forward

This is a "Nothing To Do With Forensics" editorial.

I may have rocked the boat with my last two editorials. I know for a fact that they have stimulated conversations and there has been both agreement and disagreement with the points presented. I extend an invitation, especially to those of you who disagree, to put pen to paper and send in your viewpoint.

The holiday season is here as I write this and I wanted to back off a bit, and take a more circumspect approach to this column. So if you were looking for a hot forensic controversy, you will not find it here.

I am sitting here on a late Sunday afternoon by the beach, watching my son play his first LaCrosse game. There is a brilliant sunset in the making. The air is crisp with a hint of wood smoke coming from nearby fireplaces. How peaceful it all seems amidst the many things that have changed in the world.

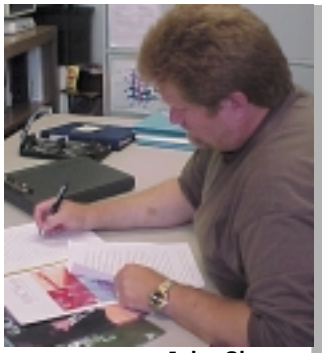
There are so many important things happening around us. My son's Lacrosse game is important. The carving of the turkey is important. Lighting the Christmas tree is important. Our friends and loved ones around us are important. Every moment that passes is important.

September 11th is slowly but steadily moving into the past but the memory of so many people killed remains painfully ever present. It brought out the best in us. Regardless of our race, creed, color, sex, religion, or challenges, united we stand in our hearts and our spirits. We are tied together through our humanity, through our responsibilities to society, and through our responsibilities to each other. Will we still stand united after September 11th has faded to a page in a history book? I wonder.

The other morning I heard about an African-American mother out walking her daughter in a stroller. Three white men pulled up alongside her and started throwing rocks at her, hitting her in the head. They drove off laughing down the street and disappeared. I wonder where these people fit into the family of man. And where do the terrorists fit in? I cannot even begin to pretend to know or understand.

What can we do for each other? Smile. Offer a kind word. Offer a kind thought or deed. Commit a random act of kindness. "Pay it forward." Work daily to strengthen our ties because there are those who work daily to undermine them. Don't tolerate attempts to tear anyone down. We have always been tied together, you and I, even before September 11th. Somehow we lose track of important things until a traumatic event makes us refocus.

These are my personal thoughts for the holidays. May 2002 bring the best to you, your family, and your friends. But don't wait for the best to happen. ***Make*** the best happen.



John Simms
CAC Editorial Secretary

AFQAM?

by Jim White

AFQAM – Is that some sort of supplemental insurance? No, but we hope that it will be supplemental assurance.

On October 9th and 10th, a group of 23 forensic quality managers met in Kansas City. This group was sub-set of a 90 member E-mail list for people interested in forensic quality issues. That group was started by the Southern California CAC QA study group as a forum for the immediate discussion of quality issues without the inconvenience of waiting for the next study group meeting[1].

Like many ideas to come out of CAC, this group caught on. First, it spread to Northern California following the formation of their QA study group. Then, as word of the great wisdom and insightful discussions that were taking place got around, forensic quality people from all over the country hopped on.

As this E-mail group flourished, it became apparent that there were some issues (e.g. auditing, proficiency testing, corrective actions, and other fun stuff) common to us all, but not necessarily important on a day-to-day basis to bench criminalists or their supervisors. Hence, Kansas City.

In Kansas City we not only discovered that we were a fine collection of insightful and witty people, but that we did indeed have some common goals and objectives. Out of this meeting arose (hum, maybe we should have met in Phoenix) the Association of Forensic Quality Assurance Managers (AFQAM).

The major goal of AFQAM is to assist in giving the criminal justice community quality forensic science services. This is certainly a major goal for all of us, but AFQAM feels that its members will be working toward this goal using different tools than the majority of forensic scientists. In addition, we hope as a group to be of assistance to ASCLD, ASCLD/LAB, CACLD, and other groups on forensic quality issues.

Are you actively engaged in forensic quality assurance and interested in this group? Initially the membership is limited to those who went to the Kansas City meeting. Those attendees have formed the initial committees who will work to get the organization off the ground. The initial executive committee is composed of Rick Groff, Idaho State Police, Chair; John Simms, San Diego Police, Vice Chair; Kathy Wagner, San Diego Sheriff, Secretary; and Randall Robbins, Illinois State Police, Treasurer. The fifth position on the committee is Past Chair. Since, obviously, we don't have one, I am filling that slot as Bylaws Chair.

We hope to get the Association formed legally by the spring, at which time membership will be available to anyone involved in the forensic quality process.

[1] For more details on this formative process, see *CACNews*, 3rd Q 2001, K. Wagner, Quality Assured, p. 12

Leveling the Scales of Justice

Does forensic science show a bias toward the prosecution?

To many people, there may be a perception that forensic science is biased toward the prosecution. After all, forensic laboratories get their work from police who are looking to prosecute. Other requests for forensic expertise come from prosecutors themselves. Forensic scientists are called to testify 95% of the time for the prosecution and their testimony favours the prosecution - if it didn't they would not be called. Upon closer inspection, however, it is not that simple. Does forensic science show bias in favour of the prosecution? This is the question my commentary will explore.

In the UK, Peter Webbon is the Chief veterinary advisor to the Jockey Club, the organization that oversees Britain's lucrative horse racing business. During the spring of 2001, a hoof and mouth epidemic was raging throughout farms in the UK, posing a potential threat to the horse racing industry. No one was saying for certain if horses could transmit the disease, or not. Mr. Webbon had this to say about his role in determining if horses should continue to compete during this national crisis. "My job is to advise the decision-makers about the science of the issue. I pass on the information to them and they make the decisions," relates Webbon. [1]

What does this have to do with forensic science? It seems to me that this is exactly what a forensic scientist does when testifying in a criminal court of law – the decision-makers being ordinary citizens seated inside the jury box. Can this be accomplished is a way that does not favour the prosecution? In one word, absolutely. I will elaborate on this answer by examining the possibility of bias affecting the four stages of the forensic process that are applied to every criminal case. Not everyone will share my thoughts on this topic. My aim is to create a dialogue so we can all benefit from each other's point of view.

The Four Stages of the Forensic Process

After a crime has been committed, the perpetrator may leave behind, or take with him, physical evidence. The recognition and recovery of this evidence is the first stage of the forensic process. Recovered evidence must then be analysed. This is usually done inside a forensic laboratory, where conventional disciplines such as chemistry and biology, among various others, play a role. The third stage of the forensic process is interpretation, and represents the heart of forensic science. During the interpretation stage, conclusions are reached on experimental results. The three preceding parts of the forensic process are summarised in the final stage, the presentation. The presentation typically takes the form of a report and the scientist must be prepared to explain this report in such a way that a stereotypically science-phobic judge and jury are able to comprehend it. Presentation is everything.

These four basic principles of the forensic process will serve as the framework when examining the effect of bias on forensic science within the criminal legal process. Each stage will be examined independently and I will demonstrate that, although the system in which forensic science operates can at times appear to be biased toward the prosecution, forensic scientists themselves are not biased. Before we begin, let's take a closer look at this word bias.

Webster's defines bias as a preference or inclination, especially one that inhibits impartial judgement. Interestingly, bias can also mean a line going diagonal across the grain of fabric. If one combines the two definitions, it is tempting to extend the meaning of bias to include an inhibiting preference by those involved in the fabric of the criminal legal process. In this over-the-top definition, the "fabric" is composed of the individual threads that make up the criminal legal garment - the police, scene examiners, lawyers, witnesses, the judge and members of the jury. The threads of this fictional garment will provide the focus of discussion for this paper.

No Victim to Avenge

As I previously stated, I do not believe that forensic science shows a preference toward the prosecution. This is not to say there are not incompetent (or biased) forensic practitioners. Most people connected to the forensic field are aware (or perhaps have even known) a type of 'expert' referred to as a 'liar-for-hire' – an individual who, with malicious intent, twists or alters the facts to fit the needs of their client, who, in most cases, is the defence. This corrupt 'expert' may be a rare phenomenon, but they have, unfortunately, participated within the criminal legal process. 'Liars-for-hire' aside, I will state with the certainty applied to a one in a billion DNA 'hit' that today's forensic scientists, especially those who testify for the prosecution, abide by this simple truth put forth by Dr. P.C. Brouardel, a 19th-century French forensic scientist.

"If the law has made you a witness, remain a man of science. You have no victim to avenge no guilty or innocent person to convict or save – you must bear testimony within the limits of science." [2]

Recently, I have finished reading Stuart Kind's unique autobiography The Sceptical Witness which, by the way, is a great read for forensic scientists at every level of experience. Before retiring, Mr Kind was a forensic practitioner in the UK for some fifty years. In his book, he reflects upon the time that he was giving evidence for the prosecution when the defending counsel in cross-examination asks him:

Dianne Burns is currently on a lab placement at the Edinburgh Police Forensic Crime Laboratory in Scotland as part of her MSc program with King's College of London. She can be reached at diane.burns@kcl.ac.uk

"Mr Kind, you appear as a witness for the prosecution. Can you convince the court that you are totally unbiased in this matter?"

He responds in the only way a forensic expert can. "Well, I don't know if I am unbiased. I certainly try to be." [3]

With this response, Stuart Kind takes into account something that affects us all—unconscious bias. How can any individual, forensic practitioner included, be objective enough to comment on one's own unconscious bias? The only appropriate response is Mr Kind's; "I certainly try to be." With this thought in mind, let's examine what effect bias plays on the first stage of the forensic process, evidence collection.

Recovery of Evidence

The question of bias begins at the evidence collection stage. No matter how good (or unbiased) the forensic tools scientists apply to the evidence are, it can never be better than the choice of samples they are provided with. For example, evidence that is neither recognised nor collected has no value to the investigation process. [4] It is my own personal belief, and the belief of many others, that the most critical part of any criminal investigation is the recovery of evidence stage. The reason for this is twofold.

First, the scene begins to change the moment after the act takes place. Within an isolated fragment of time, there is only one opportunity to identify, collect and document the evidence from a scene of crime. There is no going back. Secondly, the evidence defines what questions a scientist asks during the analysis stage of the forensic process. If the right question is not asked, you will not get the right answer, regardless of the brilliance of your analysis. [5]

If the scientist does not collect the evidence himself, how can he be absolutely certain it was done so in a non-biased manner? Legitimate questions should be raised. Did the police, for the most part without the benefit of a scientific education, collect the correct evidence from the scene? Was something important left behind? Is the crime scene examiner's level of expertise sufficient? As the seconds tick by, time and human intrusion compromise a crime scene, jeopardising the answers to these questions. Meanwhile, the forensic scientist frequently remains back at the laboratory, isolated from the scene. Forensic investigation is not an isolated process, however. To be maximally effective, forensic investigation should interrelate, rather than isolate, the various forensic disciplines.

It is important to acknowledge that although the forensic scientist is often not present at the crime scene, it is not uncommon to request additional information in an attempt to clarify any avenues that would affect his or her interpretation of the evidence. For instance, scene photographs and videos are frequently submitted to the laboratory and the examination of these by the scientist can lead to a request for other items.

Although it may seem obvious, it is important to realise that police are not under any obligation to display objectivity. I have spoken to one crime scenes examiner who told me straight out, "Of course we are biased toward the prosecution" My own feeling is that this is one of the realities of the job. Essentially, police are paid to answer the question "who is responsible for this crime?" Their job is to protect society from criminals. Although the police are suppliers of scientific evidence, scientists and police go about their jobs using opposing methodology. The police try to prove their hypothesis (i.e. this is the guy who committed the crime) while scientists, as I will demonstrate later in this essay, try to disprove theirs.

Is it possible for the police to be impartial when collecting their evidence? For most routine cases I am sure it is. What about a serious case where forensic work is critical? I will suggest that if a bias does exist in the criminal legal process, evidence collection is a potential fertile ground.

Is it possible to work for a police department and deliver bias free testimony independently from the cogs of police machinery? Absolutely and here is why I say so.

What About Quality control?

Most people do not realise that there are no formal forensic science principles concerning evidence recovery. [7] As a consequence, quality control of the evidence collection process is worth examining. Unlike accredited forensic laboratories that make use of both internal and external quality assurance methods, British Crime Scene Investigators (CSI's) employ their own quality control/assurance process. The quality of a British CSI's performance is determined by internal review only. Is it legitimate to inspect one's own ranks? I am always inherently suspicious of any group that examines itself and comes to a conclusion about their own job performance. According to FSS scientist Peter White, an airtight quality management system "can be a real source of reassurance to the individual forensic scientist, the criminal legal process and the public at large." [8] Why not use an external body to evaluate the evidence collection process? The mere fact of having an independent external evaluation in place will help to deflect any questions of bias.

The actual collection of evidence may not be the only area where bias may creep into the forensic process. The police can also bias the evidence they turn over to the scientist by the way they write their report. One crime scene examiner told me that aspects as fundamental as word choice or the inclusion of witness statements could skew a report in the prosecution's (i.e. police) favour. When read by a scientist in a laboratory, what effect would this have on the choice of tests during the analysis stage of the forensic process?

The scientist in charge of training for the Forensic Science Service came to King's College London to give two lectures covering Crime Scene Management and Quality Assurance. While speaking, he introduced the acronym G.I.F.T. (get it the first time). In my opinion, getting it the first time relies upon the tool carried between the evidence collector's ears.

Herein lies a potential variable that has the latent capacity to bias the entire forensic process.

Now is an appropriate time to point out that I realise I appear to characterise the police and CSI's as being undereducated and inferior to forensic scientists. This most certainly is not the case and my intention is not to bash the policing process. Scientists and police simply operate in different worlds, reminiscent of the different set of operating procedures and values in operation when scientists and lawyers clash inside the courtroom. Law enforcement and forensic science are obliged to connect harmoniously within the spokes of the forensic cycle and when examining this relationship a variety of differences do become apparent.

Analysis

It is in the laboratory that the forensic scientist finally takes control of the evidence. In examining the question of bias in the laboratory, an understanding of how a scientist goes about analysing forensic evidence needs to be understood. A typical method used for evidence examination begins with the forensic scientist asking questions and turning these questions into hypotheses. For example, the blood sample from the deceased contains morphine is a hypothesis.

When investigating this hypothesis, science in general (and forensics in particular) has adopted the scientific philosophy of Austrian Karl Popper, who in the 1930's coined the term "falsification" to describe what a scientist really does. According to Popper, experiments are designed to falsify the hypothesis under test, not to demonstrate its truth. [9] If, after experimentation, the presence of morphine can not be disproved, then in Popperian fashion the scientist says that he has been unable to falsify the hypothesis and therefore it must be true, assuming no new information comes forth.

From the morphine hypothesis given previously, let's say morphine has been confirmed to be present in the blood. More questions are asked and alternative hypotheses are developed. Is the presence of morphine suspicious? Could it be from a completely innocent source such as legitimately taken medication or even poppy seeds? Care must be taken before criminal associations can be made. It is in precisely this manner that forensic science distinguishes itself from police work - an innocent explanation of the evidence must be given equal consideration and any alternative hypotheses must be examined before conclusions can be drawn.

Scientific conclusions that compare alternative hypotheses are known as likelihood ratios (LR's) and will be addressed more fully during the interpretation stage of this essay. At this point I will mention that likelihood ratios, by their very nature, present a non-bias interpretation of experimental results and are increasingly becoming an effective tool for the court going scientist. An excellent example of the alternative hypothesis concept is found in a correspondence I had with Forensic Science Service toxicologist Julie Evans whose work helped convict the man involved in the largest serial homicide case to ever occur in England – the Harold Shipman case.

In response to my enquiry about the *Shipman* case, Julie said to me, "Strictly speaking there is no ownership of a witness and the [forensic] witness should not be influenced by who is paying the bill. It is precisely for this reason that in interpreting my findings in the *Shipman* case, I had to consider alternative (innocent) explanations for the presence of morphine in the victims. It is a credit to the scientists employed by the defence… that they all agreed with the conclusions I had drawn. It also demonstrated that we (the defence and the prosecution) had all gone through the same thought process as they too had offered the same alternatives that I had. Those experts also discounted those proposed alternatives."

This scientist explored every possible alternative theory as to why morphine was found in fourteen disinterred bodies, before arriving at a conclusion. Her work is testimony to the unbiased, open-minded approach that a forensic scientist is obligated to undertake when analysing evidence. Furthermore, her expression of impartiality is not an isolated incident.

In another case, Franco Tomei, a FSS firearms expert with twenty-four years of casework experience, told me about an experience he had as an expert for the prosecution. During a pre-trial meeting with the forensic scientist hired by the defence, Mr Tomei explained his conclusions about the reconstruction of events from a shooting homicide. After going over Mr Tomei's report, the defence scientist came to the identical conclusion that Mr.Tomei had, despite the obvious negative repercussions to those employing him. In this manner, forensic scientists allow the evidence to speak the truth.

Because the era of the individual scientist wearing multiple hats in the lab and single handily performing tests on blood, glass fragments, and fibres has gone the way of the manual typewriter, an unintentionally effective new form of bias detection has been created inside the laboratory. The modern forensic scientist is a specialist. According to Chris Hadkiss, the director of the DNA unit at the FSS lab in London, the DNA analysis of a single bloodstain may have as many as eight different laboratory personnel involved. An anti-bias system of checks and balances is the result. Furthermore, after this "conveyor belt" of scientists and technicians completes the analysis, their work undergoes a technical review and a second read before any results leave the lab.

Courts are aware of this process and don't waste court time challenging analytical results from the laboratory. They accept that the instrumentation and the data produced are not biased. Proficiency testing of scientists, external validation of the methods and techniques used, peer review and laboratory accreditation all act as a seal of approval for the scientists themselves and the laboratories they work in. This umbrella of quality assurance effectively circumvents any question of analysis bias.

Forensic scientists are not flawless, however. Mistakes do occur. Old, outdated test solutions can be used. Simple things like neglecting to change gloves when you should or forgetting to use filtered tips on your Gilson pipette are but a few of the everyday mistakes that can and do occur. There is no avoiding them because we are human and humans make mistakes, but knowing this scientists design procedures that detect these mistakes before they escape from the lab in the form of an erroneous report. [10]

In regard to contamination inside the laboratory, scientists are able to detect contamination of their work through the proper use of controls. They can not, however, control the amount of contamination the evidence undergoes prior to its arrival to the lab. In California, O. J. Simpson was acquitted because the jury was convinced that the crime scene was contaminated, compromised and ultimately corrupted. The twelve people on that jury let the world know that the police working the multiple crime scenes involved in the Simpson case were biased in favour of the prosecution. As a result, a reasonable doubt remained in their minds about Simpson's guilt.

The point of referring to the Simpson case is that scientists inside a laboratory can only have an effect on the part of the process they control. Any bias during the evidence collection process will manifest itself inside the forensic laboratory. According to Jerry Chisholm, a California forensic scientist who has worked thousands of crime scenes during his career, forensic scientists cannot assume that they are unbiased in their examinations if their samples are biased to begin with. [11]

Interpretation

The interpretation stage of the forensic process distinguishes the technologist from the scientist, the trainee learning theory from the practitioner. Quite often, interpretation boils down to simply trying to provide a picture of how an incident occurred.

In what may be directly attributed to the white-hot DNA juggernaut, today's court of law requires a quantitative way of expressing a forensic scientist's interpretation of the evidence. Several FSS scientists, Ian Evett and Graham Jackson among them, have written a series of interesting articles addressing the decision making process before, and during, the interpretation stage of the forensic process. What they have proposed is based on Bayesian statistics and the comparison of competing hypotheses. This method makes a forensic scientist think about two hypotheses instead of one. It is not unusual, as Julie Evans noted in the Shipman case, for the competing hypotheses to take the following form. *The likelihood of the evidence given the prosecution's position; The likelihood of the evidence given the defence position*

Presented in this way, an undeniable impartial interpretation of forensic evidence is created.

Graham Jackson spoke at a Paint, Glass and Fibre conference I attended recently in Edinburgh. Mr Jackson goes on record as saying, "I can not think of a better method in which to demonstrate an impartial approach," than using the competing hypotheses method. [12]

Legal advocates routinely misuse this method while in a court of law, creating a perception of bias. In what is commonly referred to as the prosecution's fallacy, prosecution lawyers love to twist the wording around to fit their needs. Here is what the prosecution would incorrectly like the court to understand: *What is the probability that the defendant committed the crime given the evidence?*

The proper phrasing is: What is the probability of the evidence given that the defendant committed the crime?

An understanding of the fundamental difference between these two questions is essential if evidence is going to be evaluated in a non-biased, scientific manner. This is not easy to do.

Judges, instructors at forensic educational programs, the media, and even forensic scientists themselves often do not understand the difference between the two forms of the question.

It is helpful to keep in mind that as far as forensic science is concerned, the question before a criminal court is not whether the accused is guilty. Rather, the question is whether based on the evidence it has been proved beyond all reasonable doubt that the accused has committed a specific offence. The prosecutor's fallacy is one of the principle contributors to the perception of bias toward the prosecution by forensic science.

Another consideration that is rapidly gaining momentum is the fact that DNA has the power to not only convict the guilty, but is capable also of exonerating the innocent. This will become more obvious as increasing numbers of wrongly convicted citizens are released from prison after having their case evidence re-examined using DNA analysis. Politics and the law have only begun recently to adapt to the exonerating powers of DNA. Attorneys Barry Scheck and Peter Neufield operate the Innocence Project, an organisation that is dedicated to re-examining cases of behalf of wrongly convicted individuals. Clearly, forensic science utilised in this manner can never be construed as being bias toward the prosecution.

Forensic Science in the Witness Box

The law is the last result of human wisdom acting upon human experience for the benefit of the public—*Samuel Johnson*

Few forensic scientists have the opportunity to be a guest inside the private chambers of a criminal court judge while he is on lunch break during a murder trial. Such was my good fortune when I recently enjoyed the privilege of visiting with Judge van der Werff, the most senior judge of the Inner Crown Court of London. Looking relaxed and remarkably different with his wig and gown removed, he offered me this unsolicited advice. "As a forensic scientist, you are to remain perfectly impartial, addressing only the evidence." When I asked if he felt that the jury sees the forensic scientist as biased toward the prosecution, he responded, "No. Jurors take their job very seriously. They rely upon the accuracy and reliability of the expert evidence given by forensic scientists. The scientist witness should not try to guess what may lie behind questions put by councel but should always answer in a purely scientific way."

For the forensic scientist, courtroom testimony represents the climax to all the work put forth analysing and interpreting the evidence. It is where the rubber meets the road, so to speak, for this is the forensic scientist's only opportunity to address the people who are in charge of determining the fate of the defendant. Stuart Kind points out that *"all expert evidence is modulated by the personality of the giver."*[13] If delivered correctly, the only conclusion a jury can reach is that the forensic scientist is an independent testifier who has no cause to uphold other than the truth the evidence speaks. Echoes of Brouandel's "you have no guilty or innocent person to convict or save" must framework forensic testimony.

Forensic testimony takes place inside a court of law and not a court of science. As such, the scientist must behave as an invited guest and recognise the judge and jury members as the hosts. Word choice is critical, for if the jury does not understand the scientist's language they will turn off and the results will spell disaster. Quoting telephone number length statistics will cause eyes to glaze over like grandpa reading bedtime stories to his three-year old granddaughter. Stuart Kind describes the challenge an expert witness faces as a problem of awareness. Kind insightfully points out that while the meaning of testimony is always clear to it's own author, "it is difficult to convince him it will not be equally clear to others" when they are listening. [14]

For most citizens, their only exposure to a forensic scientist is in the courtroom giving testimony on behalf of the prosecution. [15] What is their perception of the scientist as they sit inside the jury box listening to forensic testimony? Is he seen as a policeman in a white coat, an ally bonded to an already resourcefully potent prosecution service? Judge van der Werff does not believe so and neither do I. However, our feelings are not always shared by others.

Observations about biased testimony given by expert witnesses are not a new phenomenon. In *Lord Abinger v. Ashton* [1874} 22 WR 582, Sir George Jessel said: *"In matters of opinion I very much distrust expert evidence… An expert is not like an ordi-*

nary witness… but he is employed and paid in the sense of gain, being employed by the person who calls him. Now it is natural that his mind, however honest he may be, should be biased in favour of the person employing him, and accordingly we do find such bias…Undoubtedly there is a natural bias to do something serviceable for those who employ you and adequately remunerate you." [16]

Sir George is addressing the logical concept of he who pays the piper calls the tune. It is a fact that forensic scientists are often employed at police department laboratories. Such is the case for scientists in Scotland and in a number of large city laboratories throughout the world, such as Los Angeles. While I would agree there would inevitably be an awareness of the interests of your employer, this should never lead to a misrepresentation of the facts. Is it possible to work for a police department and deliver bias free testimony independently from the cogs of police machinery? Absolutely and here is why I say so.

A forensic scientist is not unlike a referee on a soccer pitch or an umpire calling a baseball game. Total impartiality is a prerequisite for the position. Integrity and objectivity are the rules of the game. I have never witnessed a sporting event where it was obvious the referee was consistently biased toward one team. If this ever were the case, the sporting official (or the forensic scientist) would eventually be culled from the ranks of his chosen field. Like a veteran referee who admits he is unable to make the call because his view of the action was obscured, the mark of a true expert forensic scientist is to admit, "I do not know the answer." Honesty effectively disarms questions of bias.

It should always be remembered that there is no injunction preventing a forensic scientist from being employed by the defence. However, in Britain and the U.S. the prosecution employs forensic scientists in 95 out of every 100 cases. I believe there are two reasons for this. First of all, the prosecution carries the burden of proof, meaning they have to prove their case 'beyond reasonable doubt.' This is the required standard and anything less means the case is lost. Expert witnesses are often the key element in achieving this goal. In contrast, the defence is under no legal obligation to prove anything and may not need to call any witnesses in order to win their case. The second consideration is, practically speaking, your everyday murderer or sexual predator has very limited resources and may not be able to afford forensic expertise. For example, the cost of DNA analysis may stretch beyond the defendant's budget. These two factors contribute to the perception of forensic science favouring the prosecution.

It is important to keep in mind that while in the witness box, the defence councel always has the opportunity to cross-examine the forensic scientist. This will provide an opportunity for the scientist to negate any perceived perception of bias on his or her part. If there is an alternative explanation for the evidence (realistically speaking, if the defendant is innocent then there should be) then the scientist will have the opportunity to offer the alternative explanation for the court's consideration. A true professional witness should be prepared to accept that no matter how strongly he viewed his original option, if the proposal the defence offers is a realistic explanation for his findings he should advise the court accordingly. This has been the experience of toxicologist Julie Evans.

According to Mrs Evans, "My colleagues and I have provided opinions in various cases we are working on for the police that do not suit their purpose and that in fact support the defence. As such, although our original statements are produced for the prosecution, they do, on occasion, end up being used by the defence." What she is providing in this statement is not only proof of impartiality, but also a definition of the word integrity.

It is paramount to be aware that forensic science exists in a very small world. In this business, reputation is everything and no amount of 21st century technology will salvage a tarnished character. Being too closely identified with a particular position, for example always supporting the prosecution regardless of the evidence, [17] will blemish a career. Once tainted, the scientist becomes an unemployable pariah.

In common law countries such as Britain and the U.S., forensic science operates within an adversarial legal framework. As a consequence one side is telling the truth and the other side is, in effect, lying. To rise above the undesirable side effects of the adversarial process, including questions of bias, the scientist must bear three concepts in mind. First, always remember that honesty effectively disarms questions of bias. Second, the way in which you present forensic evidence before a jury will determine your credibility. Twelve ordinary people must understand what you are saying. If you are unable to do this, you may as well stay home. Finally, always allow the evidence to speak its own truth by keeping an open mind. Preconception may lead to deception.

Forensic science may operate with an evidence collection system that the scientist has no control over and with lawyers who regularly twist the interpretation of forensic evidence to fit their own needs. Nevertheless, there can be no perception of bias on the part of the forensic scientist if the individual practitioner internalises the above three concepts and maintains an honest approach—so honest, no one can ever question their integrity.

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Apparently, this is not the first time a fire of this type has erupted in a crime lab. Other incidents have been reported when either zinc/paper towel materials were tossed in waste cans when solutions of fluorescein or **Kastle-Meyer** reagent were prepared. There were no batteries present in those incidents. The fire may have been initiated by the added weight of the battery on the towels. Or, as some electrical conductivity is made when the battery makes contact with the wet zinc on the towels.

2002 McLaughlin Endowment Funding Deadlines

The Training and Resources Committee Chair must receive applications for 2002-2003 training funds by Friday, January 18, 2002. The Endowment Committee Chair must receive requests for all scholarships or research funds by Friday, March 22, 2002. Please refer to pages 17-20 of the forth quarter, 2001 CAC News for specific information. Training and Resource Surveys are due by November 1. These surveys are used by the T&R Committee to determine which courses would be of most benefit to our members. Out of almost 600 members, only 18 T&R surveys were returned last year. The Training and Resources Survey can be found on the CAC website at www.cacnews.org.

DOHS Advisory Committee- Laboratory Representatives Needed

(Submitted by Patricia Lough)

This is the first project identified by the DOHS Alcohol Advisory Committee as the top priority for crime labs. Even though only one lab may be taking advantage of this procedure, we need to have a good show of force with DOHS that all crime labs are responsive to this. The project is to develop a training program in detail of how officers can train other officers on how to use breath alcohol instruments. The criteria required have already been established. Now that we have the Governor's ear regarding our complaints about DOHS, it would be nice to have a strong show of force on changes to Title 17. Each lab should have an alcohol unit supervisor that may want to participate. This is the first step to future relations with DOHS and future Title 17 changes. Please contact Patricia Lough for further information (see above).

Historical Committee-Requests for information on Roger Green 's career

Anyone with information, photographs etc. pertaining to Roger Green's career should contact Carol Hunter, Historical Committee Chair at chunter@forensica.com. She is compiling the information to produce an article on his life.

CAC Merchandise

Curtis Smith has just released the new Fall line of CAC apparel! Please visit the CAC website for pictures and prices. New items include denim and polo shirts with the embroidered CAC logo.

General Announcements

The 4th quarter CAC News is available in .pdf format on the CAC website

Study group meetings are being planned for Jan 17, 2002 by both the Northern and Southern study (in 2 different places, of course). Check the CAC website for updated information.

CAC Website changes: If you would like to be notified when there are changes to the CAC website, please send an email to our friendly webmaster, Mark Traughber at: mark.traughber@doj.ca.gov. He will add you to his update mailing list.
The web address is www.cacnews.org.

Submitting items for the Membership E-News Update: please email requests to elissa.mayo@doj.ca.gov for consideration and placement it in the next Update, scheduled for November 28, 2001.

The Membership Update is sent to each CAC member who has provided an email address. If you would like to be removed from this list please reply with "remove" in the subject field. CAC members who wish to be added should reply with "subscribe" in the subject field. Email and address corrections are requested and should be submitted to the membership secretary.

—Elissa Mayo

European Crime Scene Examiners Basic Course:

In March 2002 the first European Crime Scene Examiner Basic Course will be held at the National Training Centre (NTC), Durham UK. This course is an initial course for crime scene investigator who handle burglary crime scenes. It is a three weeks course and it handles police photography / crime scene procedures / safety / fingerprints / footwear and tire tracks / toolmarks / DNA and contact traces. The course is in the English language and is developed by specialised crime scene investigation training institutes from England, The Netherlands, Italy and Poland.

The course and the accommodation is for free (subsidized by the Oisin-Programme of the European Union), travelling is at own costs. Students from al the EU-countries and those countries who applied for EU-membership are invited to this course. Students have to be a member of a department that handles burglary crime scenes investigations; they can be police officers or civilians and they must able to read and speak the English language. The duration of the course is 3 weeks and the maximum number of students is 12. The course date: March 4 till March 22, 2002. Students can apply for this course or ask for more information by e-mail, telephone or letter to: Mr. Shaun P. Mallinson, head of National C.S.E. Training, N.T.C., Harperley Hall, Fir Tree, Crook, Co. Durham DL158DS, England. Tel: +44-(0)1388-762191 / Fax: +44-(0)1325-742509 e-mail: admin@ntcssci.demon.co.uk / web: http://www.forensic-training.police.uk/

Kern Co. DA's Lab Has Openings

The Kern County District Attorney's Regional Crime Laboratory is announcing the availability of positions for: Paternity DNA Laboratory Director, DNA Technical Leader Criminalist (2). Interested parties should consult the the KernCounty website at www.co.kern.ca.us/person/pers.htm. Resumes may be sent to: Vernon Kyle, Chief Criminalist, c/o Kern County District Attorney's Office, Forensic Science Division, 1300 18th Street, 4th Floor, Bakersfield, CA 93301 or email vkyle@co.kern.ca.us .

norah rudin & keith inman • the proceedings of lunch

As we walked into the restaurant this afternoon, the greeter inquired as to whether we wanted to sit at the counter or in a booth. The difference, she explained upon inquiry, was that those seated at the counter would be served by the bartender, who excelled at mixing drinks, while those seated in a booth would be served by a waiter or waitress skilled in taking our order and providing it at the right time and in the right order. While walking to the booth, we took this as a fitting omen for the meal's discussion, for we had decided to talk about the same kind of division into specialties that has come to characterize much of the present-day work in a criminalistics laboratory. After providing the waitress with some small tasks for both the bartender-specialist and the cook-specialist, we turned our attention to the day's topic.

What had attracted our interest was a short review penned by Max Houck for the Journal of Forensic Sciences[1], wherein he took issue with several misspellings and other grammatical shortcomings of a recent book[2]. We are quite certain that the writers of the recent book regret misspelling the name of one of Mr. Houck's co-authors. Aside from these apparent *faux pas,* one particularly striking observation made by Houck was that the new book would be soured for many readers because of a "generalist" overtone that permeated the writing. He spent a few paragraphs demonstrating to his satisfaction that the specialist was here to stay, a fact he believes is both indisputable and inevitable. Readers were admonished to get over it and get on with the work. This struck us as fertile ground to cover during a pleasant afternoon's conversation. When the bartender's specialty arrived, we started with two questions: What do we mean by the term generalist? And what defines a specialist?

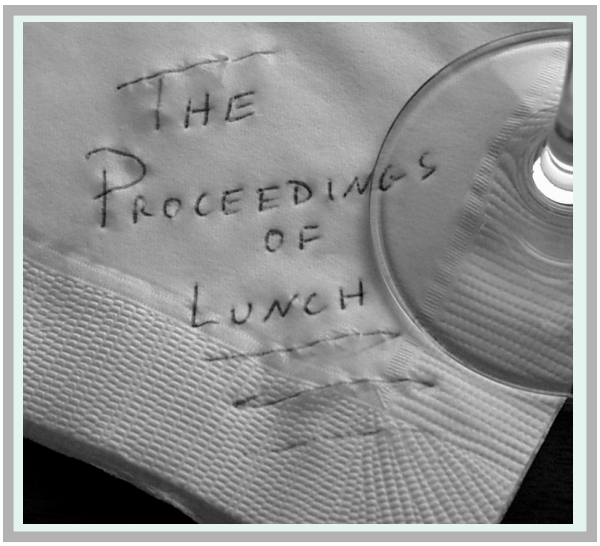
Defining the Generalist/Specialist Debate

Is a generalist one who can analyze more than one type of evidence? If so, how many more than one? Is a trace evidence examiner a generalist, because he examines soil, glass, fibers, and numerous other "traces" that are best observed with a microscope? Or is he a specialist, with his specialty defined as examining small items using a microscope? At this point, a specialist wants to know how a generalist could possibly keep up with all the technical details of every evidence type. If keeping up with all of the progress of fiber analysis is a full-time job, how could one person competently examine fibers, shoeprints, and solid dose drugs as part of his normal duties? It can be done, but not competently, insists the specialist.

Norah wondered if a generalist might be a person who worked in a full-service laboratory and transferred every three to five years into a new section. Keith reminded her that this occurred almost exclusively in California, but agreed that it might indeed qualify an individual to receive the stamp of generalist. Dissenters might suggest that this is similar to divorce being the front for serial bigamy; this type of generalist is not examining many types of evidence at the same time, but examining different types of evidence during periods of specialization in her career.

Shifting the context from the individual level to the laboratory level, Keith has seen different sections in the same laboratory mixing their conceptual metaphors, with one section being named for the evidence type "Serology", while another is named after the process "Comparative." Is comparative evidence a specialty in the same way that some consider serology (and now DNA) a specialty? Why did the serologists rate a special section, when all of the trace and track evidence was lumped into one part of the laboratory's work? And don't serologists compare the typing results from the evidence to the typing results from the reference sample?

And who should go to the crime scene, we wondered? Is it a person who is only trained in the obvious type of evidence present at the scene (such as bullets or bloodstains)? What if there are bullets, bloodstains, fingerprints, shoeprints, glass, and ignitable fluids? Do we call six specialists to the scene? Would the firearms specialist know how to preserve the ignitable fluid evidence? Would the fingerprint analyst know how to preserve the blood part of the latent print she was developing? Do we just throw our hands in the air and call out the cast from "*CSI*"?



Title design concept: Norah Rudin Photo: Calico Press

Asking the Relevant Question

We weren't sure if our heads were spinning from the interminable questions or the bartender's specialties. Norah suggested that we examine a specific example, and see if some answers emerged. We took a semen stain present on a shirt. The question submitted by one of the attorneys was not the obvious and relatively easily answered "whose is it?", but rather

the more subjective "was the semen stain spattered or smeared?" Who answers this question? In this real-life conundrum, the analyst, who had no formal training in this area, went to those in the lab trained in bloodstain pattern analysis and asked them to offer an opinion. The reply was a rather icy, "We only do blood!" What is the specialty involved here? Is it *semen*? Is it how fluids *fly* through the air and land with the greatest of ease (and in a specific shape determined by the volume, angle, and velocity)? Is it how *semen flies* through the air … you get the idea. Why should we feel stymied at such a simple problem? Has the specialist mentality paralyzed us into believing that we are incapable of examining a semen stain and considering all relevant questions, including whether it is a spatter or a smear? If so, this debate must be re-directed, for such paralysis accrues no benefit to our profession.

Historical Basis for the Division

There is clearly some history to the generalist/specialist debate. It appears to derive at least in part from evolutionary differences between those pacified by the Pacific Ocean and those buffeted by the Atlantic. We wanted to invite Dr. Paul Kirk to lunch to provide his historical perspective of the situation, but he was clearly unavailable to offer his insights and contributions to us at this time. A perusal of his writings shows a vigorous advocacy for the generalist approach, although many west coast near-contemporaries (for example, E.O. Heinrich at Berkeley and Luke May in Seattle) also understood and examined a wide range of evidence types. This advocacy and practice stands in contrast to much of the rest of the country, which developed laboratories that employed forensic science specialists. Over the telephone, at professional society meetings, and in certification and accreditation summits, discussions invariably become loud and vociferous as adherents for each position argue their case. Both Keith and Norah believe that, whatever the source of the debate, which at times can be quite rancorous, it has now become a stumbling block to a more fundamental understanding of the nature of criminalistics and the common threads that unite all forensic science analyses.

Norah thought that perhaps the real issue was not whether a person practiced a specialty or was a generalist forensic practitioner, however those terms might be defined, but whether he understood a particular analysis in the context of the case and other potential analyses. This understanding improves the chances of preserving other kinds of evidence and of asking the right question of the evidence for which the analyst *is* trained to examine. The heart of this training is a common paradigm, or a set of common principles, that are used by the fingerprint examiner, the DNA analyst, the firearms examiner, the trace specialist, the criminalist at the crime scene, and anyone else who undertakes the examination of a piece of physical evidence.

Here is where Mr. Houck seems to have missed the point; a common set of principles eliminates the need for the generalist/specialist dichotomy. For example, understanding that the process of individualization is common to evidence types such as firearms, fingerprints, shoeprints, and (probably) DNA eliminates the need to classify the analyst as a specialist or a generalist. A consensus understanding of the origin of individualizing traits by these seemingly disparate examiners unites them in an appreciation of the value of other evidence, and makes them aware of the need to both search for and preserve it in the context of the specific needs of a case. If all you have is a hammer, every problem is a nail; if you are a DNA analyst, every semen stain requires DNA analysis. But if you have the whole toolbox, you can focus on the problem, not your tool. If you are trained as a *forensic* DNA analyst, you can examine the semen stain from the perspective of the relevant question which, in our example was not "whose is it" but rather "how did it get there?" If you lack the knowledge and skills to answer the question, you have at least identified and preserved the evidence for someone who *is* capable of answering the relevant question. A common paradigm allows for this.

It is time to see the generalist/specialist debate as distracting and divisive. The relevant issue facing forensic science is deciding on the basic principles that underlie all examinations of physical evidence, and teaching these principles in an organized and overt manner to all criminalists regardless of the type of evidence that they examine. This will prepare them to apply the proper logic, scientific principles, and advanced technical skills required to effectively process any evidence presented to them.

Having agreed that the bartender was indeed an expert at his specialty, and grateful for the inspiration provided by Mr. Houck for the day's topic, we adjourned to codify these proceedings of lunch.

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Fall Seminar 2001:
'Universal'-ly Enjoyed

The Universal Hilton hotel was the gathering place for the 98th meeting of the CAC. The meeting included several well attended worksops covering topics such as collection of post-mortem sexual assault evidence, blood spatter, DNA, fire debris and trace evidence.

Thanks to the hard work of seminar organizers, Dean Gialamas, Sean Yoshi, James Carroll, Christine Pinto, Lai Chwa, Tiffany Kuwahara, Meena Shin, Dilys Chow, Ken Lee, Manuel Munoz, Barry Fisher, Harley Sagara, George Hou, Yvette Stewart, Alexa Calderaro, and Cheryl Andersen, the whole event flowed smoothly.

Among the high points was a trip to Universal Studios theme park where members finished the day's activities with rides and shows such as Jurassic Park, Waterworld and the famous studio tour.

After lively opening remarks by Los Angeles County Sheriff Lee Baca, a spirited round of comments from the audience ensued. But that wouldn't be the end of the provocative presentations. Later, seminar organizers assembled a blue-ribbon panel of experts including criminalists, a defense attorney, a prosecutor, a homicide detective, and even a Los Angeles Superior Court judge. Much of the discussion seemed to center around whether the attorneys wish we could call ourselves "forensic scientists" rather than "criminalists." That got everyone's blood pumping, and produced more dialogue than the usual presentation.

A couple of dozen vendors displayed their latest technological wares, and, judging by all the smiles, if you didn't attend, you missed something really enjoyable. You really owe it to yourself to make it to the next seminar!

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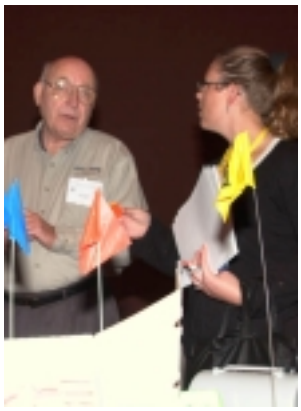
DRUGS

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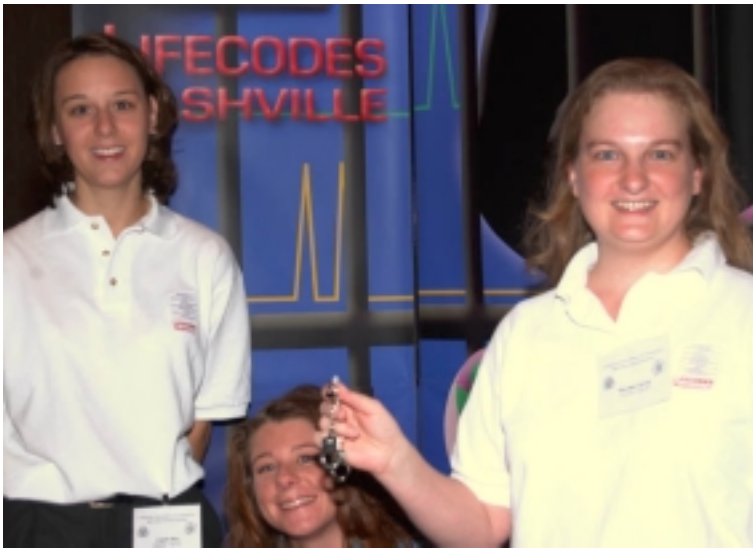
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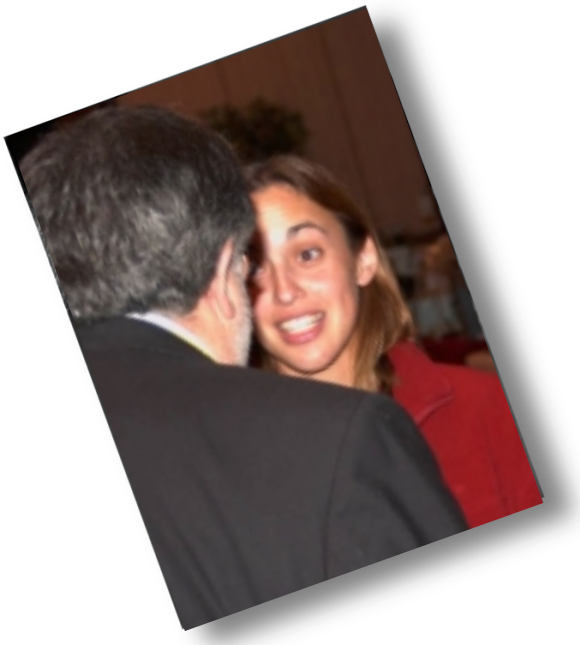
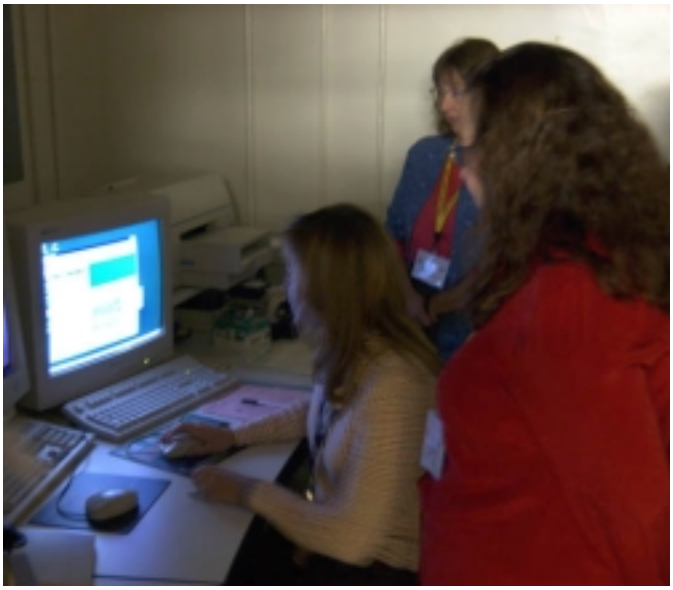
More scenes from the CAC 2001 fall seminar





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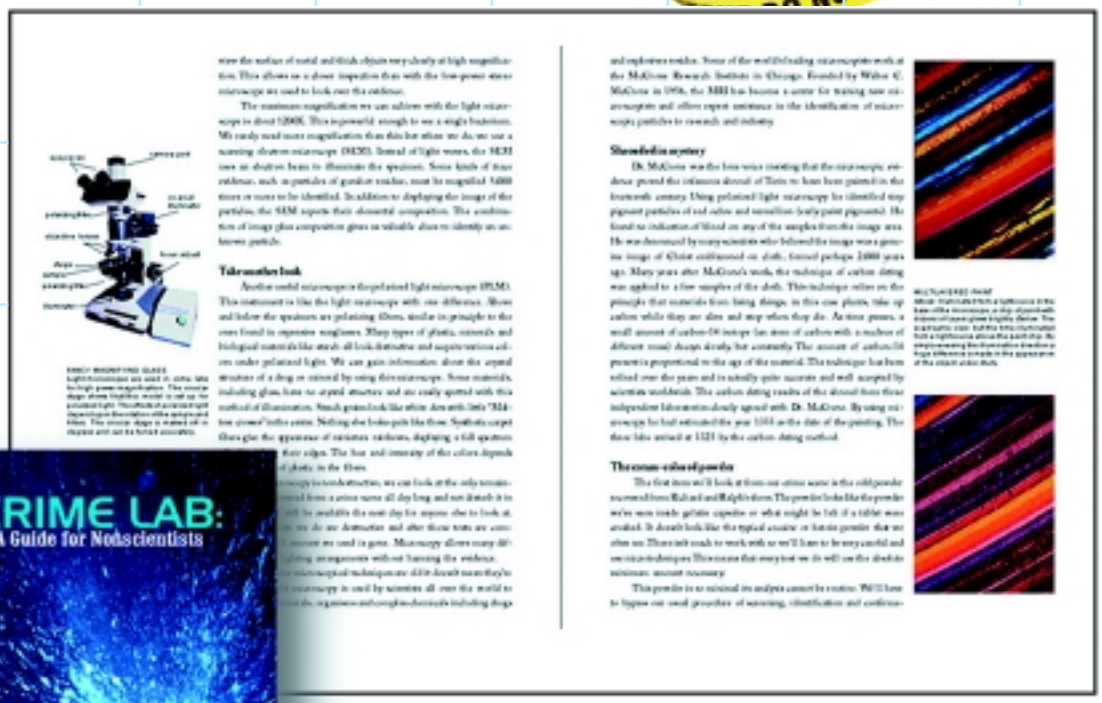
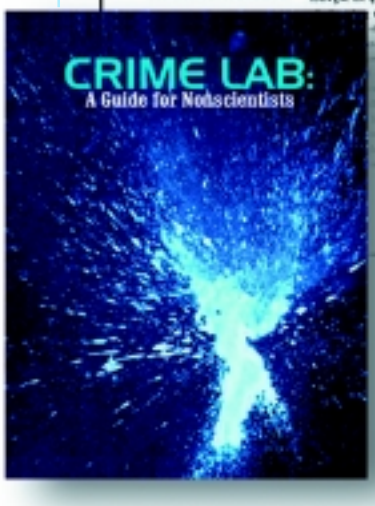
forensic science

"this illustrated tour . . . will also appeal to mystery and true crime fans, criminal justice professionals. . .and a wide range of readers." *—Booklist*





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Off to the Crime Lab!

Veteran criminalist John Houde takes you on an illustrated tour through the inner workings of a crime lab, following evidence gathered at the scene of a brutal crime, as each step of the forensic analysis is explained in easily understood terms. Intended for those who haven't picked up a science book in years, readers will learn how sexual assault evidence is processed, how trace evidence, firearms, drugs and blood are examined in a modern laboratory.

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2001 CAC Fall Seminar
A B S T R A C T S

October 17-20, 2001
Universal Hilton Hotel

Self-Cleaning Window Glass

Robert D. Blackledge
Naval Criminal Investigative Service - Regional Forensic Laboratory

Pilkington Glass has introduced a new type of window glass called Activ™. Intended only for exterior use, through the interaction of the sun's ultraviolet rays with a proprietary see-through exterior coating, dirt and other organic deposits are broken down and loosed. When it rains, dirt and grime deposits are simply washed away. Because the exterior surface is hydrophilic, no water spots remain. It is anticipated that other glass companies, including PPG, will soon follow suit with window glass based on similar technology. This new glass has significant implications for forensic science comparisons of broken glass particles. These implications, and possible methods of characterizing glass fragments originating from the treated surface side will be discussed. Free samples (such a deal!) will be available for each laboratory.

Fluorescent STR Analysis on the ABI PRISM® 3100 Genetic Analyzer

Kim Bogard and Yasser Daoudi
Applied Biosystems

Forensic DNA testing has progressed rapidly in the last decade due to advances in DNA analysis technology and automation. The development of fluorescent short tandem repeat (STR) analysis provided a highly automated and informative tool for a variety of genetic assays, including human identification applications. An advantage of fluorescent dye detection systems is that DNA fragments overlapping in size can be labeled with different dyes and thus be detected simultaneously in a single lane or injection on analysis instrumentation. Applied Biosystems' 4-dye technology, using 3 dyes to label DNA fragments and a fourth dye for the internal size standard is a well established, reliable technique for a number of DNA fragment analysis applications, including STR analysis. This 4-dye technology provided a significant increase in throughput over previous methods (e.g. radioactivity, chemiluminescence). Increasing demand for genotypic information has spurred the need for even higher-throughput solutions. To address this issue, Applied Biosystems developed the ABI PRISM® 3100 Genetic Analyzer, a new multicapillary instrument, and a new 5-dye system for automated fragment analysis. The ABI PRISM® 3100 Genetic Analyzer features 16 capillaries, and a PC running the Windows NT® Operating system. The autosampler supports two trays of either 96 or 384 samples, allowing for up to 24 hours of unattended operation. The 5-dye system further enhances throughput capabilities on ABI PRISM® instrument platforms. In this talk we will present information on the 16 capillary ABI PRISM® 3100 Genetic Analyzer, and the AmpFlSTR® Profiler Plus™ and Identifiler™ PCR Amplification Kits. The Identifiler™ kit incorporates the new 5-dye technology and will amplify 15 tetranucleotide loci and the gender identification locus Amelogenin in a single PCR reaction which provides higher throughput capabilities.

Investigations of Seasonal Variability Found in Surface Soil in Two Areas of Public Open Space

Debra Croft
Royal Holloway - University of London

Many murders, assaults and rapes are carried out in public open spaces, but the sampling of control soils at a crime scene may not be possible at the time of the incident. The implications and significance of carrying out soil sampling at differing time periods is assessed.

Experimentation was carried out initially over one year. Two experimental sites, with fifteen sample points at each site, were sampled at three monthly intervals. Various techniques for discrimination have been used; colour, carbon and nitrogen abundances and isotopic ratios, particle size, chemical analysis and organic compounds. Results are presented for the first year of study. A combination of techniques allows spatial discrimination of a local level as well as on a wider, composite site scale. Seasonality over an annual cycle is discussed, including the effects of proximal vegetation input and insect activity, with some parameters assessed as less sensitive to change.

Preparation and Analysis of Paint Samples by UV-Vis-NIR Microspectroscopy

Dr. Paul Martin
S.E.E., Inc.

One of the most common uses of paints is as a decoration. For this reason, paints usually contain one or more pigments. These pigments may be readily analyzed by UV-Vis-NIR range microspectroscopy. In addition, the clearcoats found on many automotive paints, while non-absorbing in the visible region, have distinctive ultraviolet characteristics.

The first part of this presentation will discuss the best methods for the preparation of samples for UV-Vis-NIR microspectroscopy. The second part will discuss the best methods for analysis of paint via UV-Vis-NIR microspectroscopy.

Validation of GeneAmp PCR System 9700 with 0.5 mL Block

Adam Dutra
Department of Justice - DNA Berkeley Lab

The California DOJ Berkeley laboratory is evaluating the GeneAmp PCR System 9700 with the 0.5 mL block as an alternative to the DNA Thermal Cycler 480 for the analysis of casework samples. The GeneAmp 9700 was tested for calibration and well uniformity. The annealing and denaturation temperature windows, sensitivity and TaqGold activation time were evaluated to compare optimum settings with AmpF/STR recommended protocols. Studies were performed on both the 9700 and 480 for comparison purposes as well with Profiler Plus

and Cofiler were relevant. NIST Standard Reference Materials were evaluated with both the GeneAmp 9700 and Thermal Cycler 480 to ensure concordant results.

A Comparison of Blood and Breath Alcohol Results in Subjects Arrested for Alcohol Related Offenses in the City of San Diego

Cinnamon Helms
San Diego Police Department - Forensic Science Unit

This study was designed to evaluate the breath alcohol testing program in the City of San Diego including the effects of instrument variation and sample collection time. Venous blood and paired breath results from 258 subjects arrested for alcohol related offenses from 1999 through 2000 were compared. The correlation coefficient was greater than 93% for the breath alcohol concentration (BrAC) to blood alcohol concentration (BAC) up to a BrAC of 0.26 g/210 L. In comparison to the BAC results, the BrAC was lower in 71% of the cases by 0.01 to 0.09g/210L, in agreement in 20.5% cases, and up to 0.02 g/210 L greater in 8.5% cases. If the 3-decimal blood alcohol results were rounded up, only 3% of the BrAC tests remained 0.01 g/210 L greater than the BAC results, which is consistent with analytical variation alone. Different breath instruments and differences in time lag between sample collection did not appear to influence the results.

The Effectiveness of Luminol vs. Time, Paint, Wallpaper, and Cleaning Agents

Arleen Kathyrn Lim
San Diego Police Department - Forensic Science Unit

Luminol and other blood detecting chemicals are used frequently at crime scenes where cleanup is suspected. The objective of this study is to determine the effectiveness of Luminol when the following types of cleanup have been performed: bloodstains that have been painted over, bloodstains that have been cleaned and painted over, bloodstains that have been wallpapered over, and bloodstains that have been cleaned and then wallpapered over.

The most common materials used to cover drywall are vinyl-coated wallpaper, semi-gloss paint, and interior flat paint. In this experiment, 40 pieces of 1/4" drywall were used. Twenty pieces were painted with two coats of semi-gloss paint, and 20 pieces were painted with two coats of interior flat paint. Blood was smeared, blotted, and spattered onto the painted drywall and these were allowed to dry for 1, 6, 12, or 24 hours. Upon completion of the drying time, the following cleaning agents were used on separate pieces of the painted drywall: water only, water and liquid detergent, water and 10% bleach, and 409 cleaner. They were cleaned until no blood was visible. After cleaning, either wallpaper or an additional two coats of paint were applied and allowed to dry. The drywall was sprayed with Luminol and the results were interpreted and documented.

In this experiment we observed several things. No reactions were visible in any of the drywall treated with the wallpaper. The application of two coats of paint over undiluted bloodstains did not appear to diminish the visualization of the Luminol reaction. Cleaning with detergent, bleach, 409, and water was able to reduce the reaction of luminol with the blood; however, it was not successful in completely eliminating the blood. It was also noted that the longer the blood was allowed to absorb into the painted drywall, the stronger the Luminol reaction. After doing this experiment, we learned that Luminol can be an effective agent in the detection of blood at crime scenes where cleanup is suspected.

Interpretational Issues in Amylase Testing

Christine Lisnock; Lawrence Quarino, Ph.D.; Nora Moynihan; Mechthild Prinz, Ph.D.
New York Office of Chief Medical Examiner - Department of Forensic Biology and California State University, Los Angeles - Department of Criminal Justice

High levels of amylase activity are usually indicative of the presence of saliva. With the exception of feces, no other body fluid approaches the level of amylase activity in dried stains. This normally does not pose interpretational issues since fecal stains can be differentiated visually. At lower levels of amylase activity (below 0.04 units) in dried stains, however, the origin of the amylase is difficult to determine using traditional techniques. Human amylase can be either salivary or pancreatic in origin. Pancreatic amylase is found in many types of body fluids other than saliva and is the source of high activity in fecal stains. Amylase testing of vaginal swabs may be used as an indication of oral sodomy. At levels below 0.04 units, the source of the amylase may be either salivary, endogenous from vaginal secretion, or bacterial. A proper threshold in radial diffusion for the likelihood of salivary amylase on vaginal swabs in both post-mortem samples and alive subjects will be offered. Discussion will also focus on the development of an ELISA technique utilizing monoclonal anti-salivary amylase for the identification of saliva. Finally, amylase activity in dried saliva stains will be correlated with DNA concentration.

STR- Typing of Nuclear DNA from Human Fecal Matter

Liane R. Martin, M.S.
California State University, Los Angeles - Department of Criminal Justice

Human fecal matter is routinely encountered in forensic casework; for example, sexual homicides where the assailant defecates on/near the body, and sodomy cases where the suspect's penis or a foreign object is later sampled. Additionally, blood or semen stains can be found mixed with fecal matter, and the presence of fecal matter in these stains can prevent DNA analysis. Identifying the source of the fecal matter could link the assailant and victim.

In this study, nuclear DNA was extracted from human fecal matter using the QIAGEN QIAamp® Stool Mini Kit, and evaluated against a standard phenol-chloroform extraction procedure. This extracted DNA was then amplified and typed using the PE Applied Biosystems AmpflSTR Profiler Plus and Cofiler kits, and the ABI Prism 310 Genetic Analyzer. Fecal specimens were then subjected to various environmental conditions and sampling methods–specimens were either processed immediately as fresh samples, or under the following environmental conditions: water immersion for two hours; air dried for one week; frozen for one week and processed with or without thawing. Two sampling methods were evaluated: swab-

bing vs. excision. This extracted DNA was then carried through amplification and typing procedures.

Increased Throughput in a DNA Laboratory using a Rotation System

Lawrence Quarino, Ph.D.
New York Office of Chief Medical Examiner - Department of Forensic Biology, California State University, Los Angeles - Department of Criminal Justice

The demand for DNA testing by law enforcement groups has caused an unprecedented demand for forensic services. In many instances, laboratories do not have available resources and personnel to meet this demand. Increases in caseload and demand for increased turn around time and reduction in backlog cases may cause many forensic laboratories to rethink how cases get processed. Especially in high volume laboratories, the traditional approach of having one person take an entire case to completion may no longer be practical. Since 1996, the Forensic Biology Laboratory at the New York City Medical Examiner's Office has employed a rotation system where groups of laboratory scientist rotate through different stages of the DNA analytical scheme on a weekly basis. Samples from several cases are tested together in a bulk process. Using this method along with increasing the number of laboratory scientists, the New York City Medical Examiner's Office has decreased the number of back log cases and turn around time significantly while at the same time increasing the number of accepted cases into the laboratory. This type of system allows individual criminalists to typically handle between 75-100 cases at any one time. Since the majority of these cases are sexual assaults, a strong emphasis has been placed on processing rape kits in a timely fashion. Using the rotation system, rape kits (approximately 40-50 are submitted weekly) are typically processed in less than 3 days from the day they are submitted.

The Alcosensor IV-XL at Point of Arrest as a Portable Evidential Breath Test (PEBT)

Robert Reckers and Marty Breen
Orange Co. Sheriff/Coroner Dept - Forensic Science Services

This presentation will include information obtained during several studies over the past year. These studies include the steps taken to determine which PEBT to select for Orange County's PEBT program, a controlled drinking accuracy and precision study between the BAC DataMaster and the AlcoSensor IV-XL and finally the most recent study evaluating the possibility of condensation or "carry-over" in coth cold and room temperature AlcoSensor IV-XL units.

In the accuracy and precision study between the BAC DataMaster (IR) and the AlcoSensor IV-XL (fuel cell), average subject results were obtained from each instrument and when compared, ranged within 0.005% of each other, with an overall average difference of 0.0018% (05/15/00). In the condensation or carry-over study (05/23/01), when the unit was at room temperature, additional ambient air blanks were not required; one was sufficient for a zero ambient air blank reading in all cases. When the unit was between 10^0C and 20^0C, up to two additional ambient air blanks (totaling 3) were required to obtain a zero ambient air blank reading or Void Code 11 (High Blank-blank too high) was displayed and the test sequence was aborted. This void code would be similar to an ambient fail or blank error on a stationary breath instrument. If void code 11 was displayed, an additional evidential sequence was attempted, until a zero reading was obtained. No more than two test sequences ever had to be run on a cold unit to obtain a zero reading on the ambient air blank. One third of the time in a cold unit, the instrument was able to obtain a zero reading on the first test sequence, using the three attempts software programming.

Murder in Topanga Canyon: A Study of Physical Evidence Connections

Stephan A. Schliebe
Los Angeles County Sheriff's Department, Scientific Services Bureau

In 1997, an elderly female was found deceased on a turnout along Mulholland Highway in Calabasas. During the scene investigation, deputies were called to a residence approximately 10 miles away to take a suspicious circumstances/missing person report. The two investigations were ultimately determined to be related. This case study will demonstrate how an assemblage of physical evidence types can be used to reconstruct a crime event, and show the connections between a victim, suspect, and crime scene.

The Dirt's on You

Marianne Stam
California Department of Justice, Riverside

A woman and her small children accepted a ride from a male acquaintance. The acquaintance took them to an isolated location on the banks of the New River in Imperial County, California where he proceeded to rape the mother. He also attempted to drown her and he slit her throat. The children were hit with rocks and a brick. The victims escaped and hid for thirty hours in the river.

The suspect was arrested at his residence where some soiled and wet clothing, including a dirty pair of shoes were found. The suspect denied any contact with the victims and claimed to have not been near the crime scene. Detectives noticed some scratches on the suspect's upper left arm and lower legs. The suspect claimed that he had gotten these from his girlfriend and at work.

All sexual assault evidence was negative for semen. Although fingernail scrapings from the victim were submitted to a private laboratory for DNA testing, these were never analyzed due to time constraints. Approximately sixteen grams of soil were found on the suspect's right shoe. This soil was compared to soil from the crime scene to see if the suspect could have been at the scene and to corroborate the victims' story. Stereomicroscopy, polarized light microscopy and X-Ray diffraction were used to analyze the soils. A visit to the crime scene revealed some interesting observations that assisted in the interpretation of the soil comparisons.

Soil on the suspect's shoe was similar to the crime scene soil. The limited distribution of this soil at and around the crime scene added significance to the observed similarities between the sample from the suspect's shoe and the soil at the scene.

Crime Laboratory Enhancement

Essay by Lowell W. Bradford

Where in the arena of law, justice and enforcement, is the appropriate location for a crime laboratory?

When a society creates a set of laws to regulate the conduct of its constituents, an aggressive enforcement program is critical to the system. Enforcement, however, must be conducted not only on an aggressive basis, but also on an honest basis. Those who are perceived to be law breakers must have an opportunity to present facts that may mitigate the charges that they face.

In the past fifty years, there has been a population driven increase in various types of crimes at the felony level that are malicious and more and more violent. Because of this, law enforcement has been stimulated to become more aggressive and to utilize more and more advanced technological resources in coping with the wave of unlawful conduct with which it is faced. This has caused the agencies to consider that, if reasonable grounds for arrest appear to be present, arrestees have violated the law and consequently the agencies use all efforts to be certain that they are brought to the conviction stage as conclusively as possible. This is exactly what society expects of law enforcement.

Given the need for aggressive and efficient enforcement and apprehension, it is also given that things are not always what they seem to be, and that "thinking that something is so, does not make it so". Whatever the certainty of the violation appears to be, it is nevertheless in the interest of truth and justice, that before complaints against persons under investigation are filed, such accused persons should have an opportunity to present the facts from their point of view.

Several decades ago, a popular television program that involved the daily work of a District Attorney Staff, started each program with the gong-like sound of a pounding gavel upon which was superimposed a loud authoritative voice with words to the effect that:

"The district attorney is as much interested in freeing the innocent as in prosecuting the guilty"

The program has long since disappeared. However, this concept was certainly a truism of many prosecutors in days gone by. A case in point involves a District attorney in Northern California who maintained a strict office rule that before a felony complaint was issued, the accused must be invited to appear at his offices, in custody or not, and present any substantive information or argument that would oppose the issuance of a formal complaint. Prior to the dismissal of a case on a basis of insufficient evidence to proceed, deputy prosecutors were required to report to the boss why they issued a complaint, which they now want to be dismissed. Result—there were very few cases that required dismissal because of lack of evidence.

With regard to this particular agency, the policy of looking into all avenues of possible evidence that might be exculpatory prevented a number of miscarriages of justice. On the other hand, when no such evidence could be found, it opened the door for a full-course intensive prosecution. Unfortunately this ideal situation no longer exists in most prosecutorial agencies.

Despite the fact that there was once a prosecutorial policy of giving consideration to the interests of accused persons, there has never been much, if any, interest in the production of television entertainment programs that demonstrate the role of crime laboratories in finding evidence that exonerates the accused.

While assisting law enforcement investigations in support of their mission, the forensic scientist must maintain the delicate status of being an examiner who will endeavor to find all of the physical evidence facts that are involved in an incident, and so report in a manner what will *"let the chips fall where they may,"* and play devil's advocate at all times. A forensic scientist should never be concerned with the question of guilt or innocence of an accused. The domain of the criminalist is strictly limited to the objective examination of physical evidence and its evaluation. Criminalists should constantly be acutely aware of the possible presence of evidence that may be exculpatory and be avid in pursuing whatever procedure is necessary to explore such possibilities and document them. It is a service to investigators to inform them as soon as possible that they are on the wrong track, if such be the case. Conversely, in the case of independent forensic science consultants employed by the defense, when exculpatory evidence is absent, and crime laboratory physical evidence authentically demonstrates evidence adverse to a defendant, the consultant performs a service to the defendant by advising of the certainty of crime laboratory findings and the exact details of prosecution evidence that can be presented.

The first crime laboratory in the United Sates was introduced in Los Angeles in 1923. A few years thereafter, laboratory facilities were established within the FBI, in New York, Chicago, and the State of California. By 1953, there were only seven city and county crime laboratories in California. The attorney general's state laboratory was provided to support all law enforcement agencies that had no local resources. The number of criminalists in the entire state at that time consisted of only 14 professionals. The laboratories at that time, except for Los Angeles, were staffed by only one to three Criminalists. At the present time there are more than 400 physical evidence examiners employed in crime laboratories in California. Investigative needs in a particular jurisdiction may require the employment of as many as 20 to 30 criminalists in some city and county laboratory systems. In the present day and age, law enforcement agencies would be unable to operate successfully without the support of scientific services.

It is now coming to light that we are faced with the tragic facts of dishonest information emanating from some crime laboratories, which has resulted in erroneous convictions including in death penalty cases. Typical examples of cases in which untruthful evidence has been introduced include:

1. CHICAGO CRIME LABORATORY —BLACK PANTHER CASE

The CCL firearms examiner testified in trial that a bullet, which killed one of the participants in a police raid shoot-out, was fired from a Black Panther gun. Reexamination by the FBI laboratory determined that it was fired from a police gun. At a subsequent grand jury inquiry to investigate that false testimony, the CCL firearms examiner testified to the effect that he would have lost his job had he testified truthfully. Despite the fact that he was caught red-handed, he remained on the job. Grand jury findings normally are not publicly exposed, but the grand jury was so perturbed by the events of this case that they aired their disgust in the almost unprecedented action of publishing a report of their findings[1].

2. LOS ANGELES CRIME LABORATORY —R.F.K. ASSASSINATION

In the matter of the Robert F. Kennedy assassination, the LAPD Crime laboratory firearms examiner testified under oath that his examination, beyond any reasonable doubt, determined that Sirhan's gun fired a bullet that was removed from Kennedy's neck. Several years later, because of the media clamor about a sec-

ond gun, a panel of seven forensic scientists[2] was appointed by the presiding judge of the superior court to examine the fired bullet evidence to settle the second gun question. The panel unanimously determined that the testimony of the statement of the LAPD firearms examiner was untrue. Follow up investigation showed that this person was the cause of other fabrications and procedural flaws in the laboratory records of this case. Although caught red-handed, he remained on the job and was later promoted.

3. OKLAHOMA CITY CRIME LABORATORY

Very recently, this laboratory has been discovered to have reported untruthful evidence in a large number of criminal trials, including death penalty cases, that have caused erroneous jury findings. The CBS television program *60 Minutes II* has presented an overview of information on this matter.

Various independent consulting forensic scientists have had the experience of reviewing evidence on behalf of criminal defense attorneys. It is apparent from such experiences that there is an undercurrent of either carelessness or subliminal advocacy in the evaluation and reporting aspects of crime laboratory workers that is sufficient to arouse concern, It is understandable, but unpardonable, that the condition posed by a criminalist working in close coordination with a detective of the same organization may provide a medium for sympathetic response to the advocative mission of the detective. This is not to say that all crime laboratory personnel are so afflicted. The bulk of crime laboratory actions are of high quality and of high ethical standards. Nevertheless, from the cases on record, *not to mention those that are here unreported*, in which evidence has been falsified, it is a demonstrated problem that is of sufficient importance to warrant an attempt at correction.

Why the presence of such irregular behavior?

One can only wonder why a person educated in science and retained in a purportedly independent and professional capacity, could be incompetent or dishonest about reporting investigative findings, and then proceed to testify untruthfully while under oath. Perhaps an explanation would be best handled by a psychiatrist.

It is evident from those who provide independent forensic science services to attorneys and law enforcement agencies that there is frequently an obscure air of police advocacy in the demeanor and performance of some crime laboratory personnel when evaluating particular items of physical evidence in a criminal case. It is possible that these competence and ethical factor shortcomings may be the result of the foundation of experience and training that the employee received, or did not receive.

In the worst case example, laboratory personnel are members of an enforcement agency by employment definition, to the extent in some cases of bearing police rank, even though they may have never had any police field experience. In some laboratories, police officers are transferred directly from a street patrol or detective unit and assigned technician-type jobs in the laboratory. They may then proceed to important case work that requires complex judgmental determinations, for which their qualifications may be seriously lacking.

An example of how this can poison the system is provided by my own experience. A director of a crime laboratory of a police department of a large city, upon his retirement, called my attention to one of his laboratory members. He said, **"Watch out for this laboratory person in the future! He was originally a police detective and he gives his buddies what they want!"** Several years later I learned that the identified person had given false testimony in more than one case. Although his dishonest acts were exposed, he continued in his position until retirement.

Crime laboratory personnel must work closely with detectives and assist them as much as possible with special scientific knowledge. They examine crime scenes and do all that they can to assist the law enforcement effort. This is the mission; however, the mission does not include incompetence or dishonesty. Nor does it mean that criminalists are cops in laboratory coats, as depicted in current television programs.

As stated above, most criminalists comply fully with ethical standards of conduct, but this leaves some who succumb to such pressures as command dominance, egotism, and organization loyalty. What remedies are available for this situation?

The first step in the enhancement process is the design of a system that will eliminate command dominance, organizational camaraderie, and inference of punitive assignments or threats of job loss for noncompliance with advocacy. This requires the adoption of an organizational format that relocates crime laboratories from being in the position of an operating arm of an enforcement agency and transfers their status to the capacity of a Scientific Support Function that is an **independent department of either city or county government**. In this way the laboratory director becomes responsible to the governing entity (mayor, city council, county commissioners, etc.) together with an advisory committee that is made up of representatives from law enforcement and other relevant agencies

There are two crime laboratories in California that are organized as a division of a district attorney department, which structure provides the closest possible approximation to the principle of professional independence at the present time. There is much to be learned from the system designers and users of such an organizational and operational structure that can be applied to a completely independent plan.

This is not the first time that there have been suggestions that crime laboratories should be independent government agencies. A 1972 National Advisory Commission listed *independence of crime laboratory work* as one of its key points[3]. It was referred to again in a dissertation to the California Association of Crime Laboratory Directors in 1984[4]. A follow-up of these recommendations has never been known to have been attempted.

A concept of optimum operational conditions is one thing, but achieving this goal will require a reorganization plan for each agency. Those in law enforcement and local government who are open minded and forward looking will welcome this plan, but objections will be raised by some enforcement agency chiefs who will consider that some of their empire will be taken away and who cannot overcome the view that: *"what we are doing is the best way, because it's the way that we have always done it."* There may also be a feeling that the level of service will be reduced by such a change.

To the contrary, crime laboratory independence presents a system through which capable management can improve effectiveness to the user together with speed and accuracy of results, and at the same time make crime laboratory operations more efficient. This will provide the opportunity to deliver a higher level of service in terms of "results in time" as well as assured dependability of quality, all at reduced cost. More importantly it will remove the loci that have been the flower bed of dishonest performance.

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2. One of whom was the author of this paper.
3. STANDARD 12.2—THE CRIME LABORATORY, The National Advisory Commission Criminal Justice on Standards & Goals; 1972
4. CONCEPTUAL CONSIDERATIONS TOWARD THE FUTURE COURSE OF CRIME LABORATORY OPERATIONS; Bradford, Lowell W.; California Association of Crime Laboratory Directors, July 13.1984.

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Have You Submitted Your T&R Survey Yet?

The Training and Resources (T&R) Committee is tasked with prioritizing training proposals submitted for CAC funding. In this effort it is critical that the T&R Committee keep up with the training needs of our members. The T&R Survey is our primary source of input from our members. Out of almost 600 members, only 18 T&R surveys were returned last year.

CAC members who complete a survey have an opportunity to voice their preferences for future CAC sponsored training. That training is not limited to the classes listed on the survey. There are spaces available for members to write in new classes that have not been offered before. If there is sufficient interest in a particular topic, the T&R Committee will research that area and seek instructors who can provide that training. CAC members can also take classes for career development or in areas that may be outside of their current work disciplines. Our survey information is also submitted to CCI to assist in their planning of future training.

The Training and Resources (T&R) Committee needs your help. Please take a few minutes to complete and send in the T&R Survey published in this newsletter. A copy of the T&R Survey is also available on the CAC website under "Current Events and Training." The website Survey looks like it is for managers only, but it can be used by anyone until an updated Survey is available online. Make sure to rank your top 3 classes.

Surveys may be completed and returned anytime, but must be received by November 1st to be counted for the following year.

Help us help you. Send in your T&R Survey today!

The "Luck Factor"

By Morris Grodsky

Pondering upon the existence of luck as a factor in forensic investigations, Morris Grodsky attempts to impose some form of order to this phenomenon. He has been able to identify three distinct categories of luck which might be evidenced in an investigation: luck related to time and place, luck related to inanimate objects, and luck related to criminal behavior. Through numerous examples from real criminal investigations, Morris guides us through a phenomemon few criminalists have ever given much thought to, yet all rely upon.

Edited by John Houde

Often, in texts dealing with criminal investigation procedures, authors will discuss important elements or components. These include *information*, whether from witnesses, victims, or suspects, *information* from archives or other formalized sources, and the application of *technology*, essentially the forensic sciences. Only rarely is the element of luck included.

One thing must be made clear at the outset, that the existence of a lucky circumstance does not diminish the role of the investigator in any way. Indeed, I would state that as a rule a skilled and imaginative investigator is essential for the recognition or interpretation of the usefulness of the lucky circumstance. What I would like to stress is that no investigator need feel threatened or devalued by the acceptance of luck as a factor in the investigation.

When we speak of luck in this context, we mean good luck, a fortunate occurrence that may help us arrive at the solution to a crime we are investigating. It may help us solve a crime that otherwise might never have been solved. Or it may allow us to arrive at a solution much more rapidly than would have been the case had the lucky circumstance never occurred. The lucky factor is something that is not within our control. If we do control it, it would no longer be classified as luck. Let me use an example to illustrate this point.

Imagine that there is a burglar who is very active in a region that includes several towns and cities. He has committed burglaries in the different jurisdictions, and though burglary investigators have accumulated considerable information, no one has yet been able to identify a suspect.

Imagine now that two investigators from different police agencies who are not even acquainted, are invited to a party at the house of a mutual friend. As they meet and converse, they realize that they are in the same line of work and in fact are both working on cases in which the same perpetrator appears to be involved. As they exchange information, they each provide links that enable them to complete a picture that leads them to a suspect.

The meeting of these two investigators was simply a lucky break that resulted in the identification and possibly the successful prosecution of a suspect. However, what if police administrators in the several jurisdictions have decided to create a "Regional Association of Burglary Investigators," a group meeting monthly for the specific purpose of exchanging information of mutual benefit. Now the exchange of information has been formalized, and would hardly come under the heading of luck, since the administrators themselves set up the mechanism for just this kind of exchange to occur.

When we think of luck in association with gaming or gambling, it seems that we are really talking about probability or rarity. And we can quantify the circumstance. If a gambler rolls eight sevens in a row with a pair of dice, we can place a numerical value on that probability. In this case chances are something less than one in two million. And we can exclaim how lucky the man is. Or perhaps a poker player draws the one card in the deck that can complete his straight flush, the lucky so-and so. And we could determine just what are the probabilities of doing these things. So in this kind of situation, it appears that there is a mathematical basis to the phenomenon we call luck. Usually we can think of it as something that happens outside the norm, something exceptional. Anatole France (1844-1924), Nobel laureate, novelist and essayist, placed a religious significance upon this phenomenon when he declared, "Chance is perhaps the pseudonym of God when he does not wish to sign his work."

I see it as random occurrence, and *I have no explanation.*

Of course, if it is to our benefit, we call it good luck. If, to the contrary, it is detrimental to us, we characterize it as bad luck. When we are considering the criminal investigation, it may well be that there is also some mathematical foundation to the existence of lucky events, and someone may have the ability to articulate and create equations to explain it, but in all honesty, I would find it beyond my capability.

The Three Categories of Luck

Pondering upon the existence of the luck factor in investigation, I have attempted to impose some form of order to this phenomenon. I have been able to identify three distinct categories of luck that might be evidenced in an investigation: Luck related to time and place, Luck related to inanimate objects, and Luck related to criminal behavior. In the material that follows, I shall endeavor to elaborate upon these categories, using case studies to illustrate my point of view.

1. Time and Place

How many times have we seen cases where a key witness just happened to be in the right place at the exactly right time to see the crime occur? I'm not certain as to how to

©Walter Houde

Morris Grodsky's criminalistics career spans some five decades beginning with undergraduate studies with Dr. Paul Kirk at the University of California, Berkeley. After receiving his masters degree at the San Francisco State College, he taught criminalistic courses at the City College of San Francisco, and was the first criminalist for the County of San Mateo. He worked as a criminalist advisor for the Agency for International Development (AID), spending four years in Brazil helping to establish a national crime laboratory. Eight more years were spent at the International Police Academy in Washington, teaching hundreds of foreign police students in criminalistics. Next, he worked for the Treasury Department at the Federal Law Enforcement Training Center where he was in charge of the Enforcement Techniques Branch and then as the Forensic Science Specialist for the Center. Following retirement, he has served as a private consultant for the Department of Justice International Criminal Investigator Training Assistance Program, (ICITAP). In this capacity, he conducted over one hundred forensic science courses in Latin-America and the Caribbean for police, investigators, prosecutors, judges and public defenders. He currenly lives in Georgia, where he has taught forensic science courses for American University and Armstrong State College.

describe this kind of luck. I see it as a confluence of events, or a particular conjunction of people or objects. It is a very specific association in time and space that contributes to the success of an investigation or criminal justice process.

The Will West Story

One of the first illustrations is an event that was to affect the history of personal identification in this country. It is a keystone event well known to identification people, but a tale worth relating for those who are not familiar with it. For the reader who seeks a detailed description of this and other events, I would heartily recommend an excellent book, " The Century of the Detective," by Jurgen Thorwald. To me this case represents a classic example of luck of the Time and Place variety.

In 1903, anthropometry or Bertillonage, the method of criminal identification using exact measurements of various parts of the body, was still dominant in the civilized world. Bertillonage was based upon the concept that no two human skeletal structures were exactly alike.

Years ago in a newspaper in Rio de Janeiro, I read a fascinating account that told of the difficulties that Henry experienced in trying to establish fingerprints as a valid means of identification. It also recounted an event that helped turn the tide in his favor. This account told of a letter to the editor that had appeared in a London newspaper about the turn of the century. I translated it to read:

"Scotland Yard, heretofore regarded as the finest police agency in the world, will become a laughing stock through all of Europe if it persists in discovering criminals through the use of accidental lines on the skin. In my opinion, no British jury will ever convict a man on the basis of proofs taken from foolish theories obtained incidentally in India, by a police official."

The letter was signed, *"An Indignant Magistrate,"* and was published in 1902.

Although this represented the attitude of resistance to these new ideas, Henry persisted in applying his system of fingerprint identification and continued to have his men obtain inked prints of arrested felons. A modest file was being developed. Now one night an event occurred that was to change these negative attitudes.

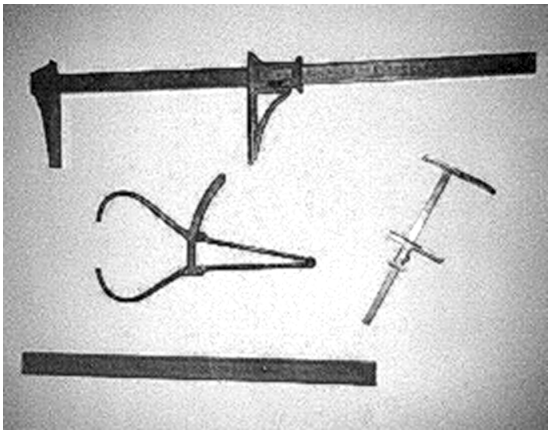
It was a foggy London night when a bobby walking his beat saw a burglar emerging from the window of a house that had just been burglarized. The policeman blew his whistle and pursued the felon into an alley that was blocked at the end by a tall iron fence that was topped by spear pointed metal rods. As the thief threw himself over the fence in his effort to escape, a ring on one of his fingers caught on one of the spear points, and the finger was actually torn off. When the Bobby arrived at the fence, the burglar had disappeared into the night, but his finger was found hanging on the fence.

This digit was brought to the identification section where it was inked and printed. Then it was compared against the prints in the modest collection and by great good fortune a matching print was found on one of the cards on file.

With the name and other vital information on the fingerprint card, it was a simple task to send detectives to the dwelling of the suspect. When the man responded to the knock on the door, his hand wrapped in bandages, the case too was essentially wrapped up. And the news that Scotland Yard had been able to immediately discover the identity of the burglar based upon the fingerprint pattern, provided a potent argument in favor of adopting this new system of identification.

It interesting to note that at the time of this writing, April, 2001, Scotland Yard is preparing for the centennial celebration of the inauguration of the Henry fingerprint system in London in 1901.

Although the concept of fingerprint identification had been recently developed and books relating to classification methods had been written both in England and Argentina, fingerprints were not yet accepted as proof of identity in the United States. In the spring of 1903, Warden McCloughty of Leavenworth penitentiary received a copy of the recently published fingerprint book written by Edward Henry. Henry, a former Commissioner of Police in India, was now the chief of the identification bureau of Scotland Yard and had only recently gained official acceptance in his own country for the use of fingerprints as a means of identification.



Instruments used for the Bertillon measurements.

McCloughty had also received materials enabling him to experiment with this new fingerprint method. It is of interest to note that at this time, he was not highly impressed. A few months later, a new inmate named Will West was being processed into Leavenworth prison. He was routinely photographed and his Bertillon measurements were taken. As the guard shuffled through the cards in the archive to properly file the newcomer's measurement card, he noted that a card with essentially the same formula was already there. As he looked at the photograph on that existing I.D card, he was struck by the fact that this was the same person who was being

LOCAL/STATE

Bad luck, police catch up with suspect

In a recent case noted above in the news clip, the hold-up man left his car keys at the crime scene. While he fled to his car and found that he didn't have the keys to start it , the victims called the police who, because of the delay were able to capture the suspect.

booked at that very moment. Not only were the measurements and the photograph of this same person, but even the name, Will West, was the same. West at that moment was supposed to be on a work detail, and the guard felt that the prisoner had somehow managed to get into the new inmate processing room as a clever dodge to escape work. A check was made, and Will West was, in fact, located at his work station. The two Wests were brought together and the effect was startling. They were like two peas in a pod. The warden was called and the measurements and photographs were reviewed. They were very much alike, like identical twins.

The two Wests however, denied any sibling relationship. Now Warden McCloughty got out his fingerprint materials and obtained inked prints from the two look-alikes. Although he was no expert, he was able to establish clear differences between the two sets of prints.

The next day, the warden called a halt to the Bertillonage measurements and instituted fingerprint processing in its place. As the story of this event at Leavenworth prison circulated throughout the police community in the United States, the death knell had been sounded for the Bertillonage identification system, and the stage had been set for the adoption of fingerprints as the principal identification system in this country.

Consider for a moment the fortunate circumstances that were present that led to this breakthrough: 1. An archive existed that carried a measurement classification and photographs of individual inmates. 2. Two inmates (probably identical twins) now happen to be present at the same penal installation at the same time. Circumstances are such that their identification cards are placed in immediate proximity to each other. 3. This allows an alert guard to note the similarity of measurement classifications in the two records and to view the almost identical physiognomy of the two individuals in question. 4. The warden of this particular facility has recently been made aware of the science of fingerprint identification. Furthermore, he has the equipment necessary to actually obtain the prints of the two subjects. He compares these prints and observes that the fingerprints can indeed differentiate between them.

I have no doubt that, in time, fingerprint identification methods would have been eventually accepted. However, as a consequence of this lucky confluence of time, place, people, and ideas, the science of identification in this country took a giant leap forward.

The Body in the Pond

I recall another case involving identification where time can be seen as a factor. This was an event not of great magnitude as investigations go, but it does serve to support the concept that I am attempting to develop. Here, we were able to make an identification that would not have been possible just a few years earlier.

One day I received a call to proceed to the northern part of our county where a dead body had been found floating in a pond. I arrived at the scene where we took some pictures and recovered the body. This victim was a young man who had been shot in the head. The interesting aspect of this case was that some deliberate effort had been made to hide the identity of the young victim. The pockets in the clothing were empty. All labels and possible identifying features had been removed from the garments of the victim. And the tips of all of the fingers had been cut off. Fingerprint identification was not possible.

We were to a large extent a bedroom community for the city of San Francisco, and on occasion bodies found in our jurisdiction were a sort of spillover from crime in that city. In this instance, our detectives believed that this was a murder that had originated or perhaps even taken place in San Francisco.

It so happened that two or three years prior to this time, the San Francisco Police Department had initiated the practice of obtaining not only the usual fingerprints, but also the palm prints of certain arrested suspects. Thus there was at least the possibility that our victim, if he had been arrested within the past two or three years might have his palm prints on file in San Francisco.

We proceeded to obtain a set of palm prints from the cadaver. These were taken to the S. F. identification section and in fact were identified as belonging to a young man who had been arrested a year or two before on some minor charge.

I cite this case only to point out the significance of time. Had this occurred perhaps four years earlier, we might have had a much more difficult problem in arriving at an identification of the victim.

In a sense, the application of a new technology may provide a break to an investigator who may now have an instrument that is of critical value in arriving at a solution that previously might have been unreachable.

The Letter Bomb Case

I have often thought of a set of circumstances that allowed me to arrive at a conclusion regarding the similar origin of two letter bombs. The late 1960's and early '70s were marked by a tremendous growth in domestic turmoil in many countries. International terrorism and violence also seemed to be a growth industry. Skyjacking, kidnapping, and assassination became commonplace. And now a new method of delivering terror through the mails appeared upon the world scene, the letter bomb. An attache at the Israeli embassy in

Palm print from body found floating in pond. This victim was identified with the use of the San Francisco PD palm print file.

London was killed by the explosion of a letter bomb. A U.S. postal employee was injured by such a device. Letter bombs began to appear in many places around the world.

For those people in law enforcement who were involved in the area of bombs and explosives, there were immediate questions. How do they work? What is the triggering mechanism? Is it electrical, mechanical, or what? The National Bomb Data Center quickly supplied information as did the Postal Service.

I was working in the Office of Public Safety of the Agency for International Development. Having spent some years in Brazil, I was now an instructor at the International Police Academy that was the training division for our organization. My subject areas included terrorist activities and bombs and explosives. So, along with many others, I had a real interest in the letter bomb. Along with the other information that I had received, in 1973 I also received a packet from our public safety advisor in Bolivia. A letter bomb had been sent to the Israeli Ambassador in La Paz. This had been intercepted, disarmed, and its components separated. Photographs had been taken at each step of this neutralization procedure. The packet sent to me contained an excellent set of these photographs that I could now use in my classes relating to this subject.

Two years later, in 1975, the Office of Public Safety had been eliminated by congressional action and a lot of police professionals, including myself, were temporarily at loose ends. During this time I was contracted by the State Department to evaluate a request from the Brazilian Government. This was a request for instrumentation to assist in the narcotraffic control. So I traveled to Brazil to make my evaluation.

While in Brasilia, I visited the National Institute of Criminalistics (NIC) where the requested instrumentation would be installed. There in the lobby was a display of exhibits from investigations in which the NIC and the Federal Police had successfully participated. What caught my attention was an easel with photographs of a letter bomb that had been sent to the Israeli Ambassador in Brazil. This device had been deactivated. Fortunately photographs had been taken at each step of the deactivation, and it was this set of photographs that were displayed in this exhibit. I had my camera with me, and my friends at the Institute let me go ahead and photograph this exhibit. Somehow the pictures appeared familiar to me.

I finished my assignment, returned to the states, and eventually had the opportunity to develop the pictures I had taken on the trip. When I placed the Brazilian letter bomb pictures next to those of the Bolivian letter bomb and compared the two envelopes, I was struck by the similarity between them. They had both been dispatched from the Netherlands, and there were the same number of stamps of the same denomination, placed in the same orientation. The cancellation impressions showed the same postal branch number, with an illegible date. The writing on both of the envelopes was done in a manuscript style, and as I carried out a comparison of the two envelopes, I arrived at the conclusion that both had been written by the same person.

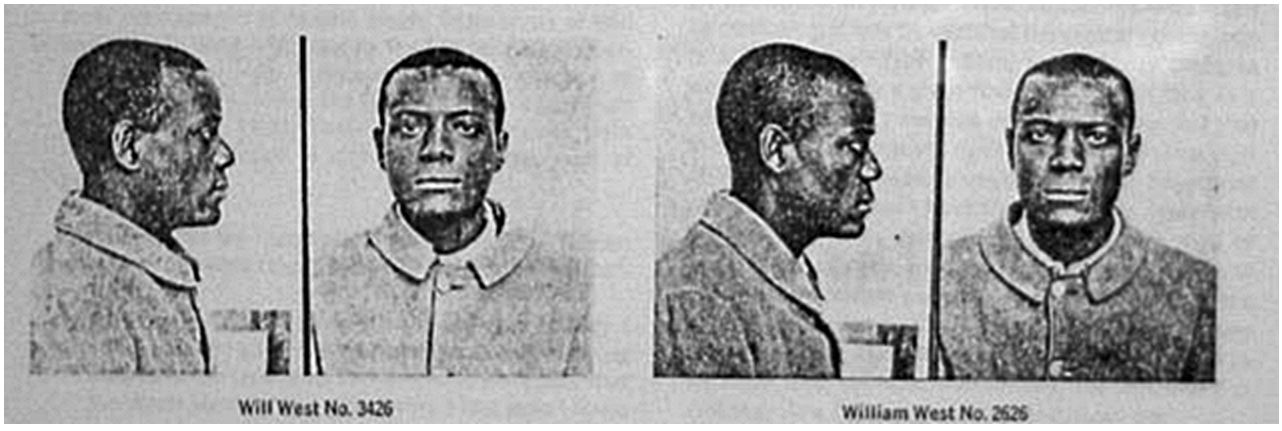
As this was now more than two years after the letter bombs had been dispatched, I didn't know what significance these findings might have had. I wrote up these results and the article was published in the Identification News. However, now, at this present moment, the interesting aspect of this has to do with the chance circumstances that led to these conclusions. 1. In 1973, in Washington D.C., I receive pictures of a letter bomb sent to La Paz, Bolivia. 2. In early 1976, while in Brasilia at the NIC, I have an opportunity to see and photograph an exhibit of a letter bomb sent to Brazil. 3. Later, I have an opportunity to do a document comparison that leads me to the conclusion that both devices were prepared by the same person or persons.

To me, this seems to be a lucky circumstance. That one person has the opportunity to bridge the geographic and temporal separation involved in viewing the two exemplars is a matter of luck or chance. That the same person also has the interest and capability to carry out a document comparison seems to compound this luck even further.

2. Inanimate Objects

Luck may also be attributed to the behavior of inanimate, non-sentient objects, materials, or things. If you imagine that I am entering into the realm of the paranormal, or metaphysical, not to worry. I'm simply describing things that can happen that turn out to beneficial to us as investigators. Under this category, I think of the possibility of some object being present that would seem to have little relation to the investigation. In some manner this object contributes to a positive development in the_case. Or the performance or nonperformance of some mechanical contrivance affects the outcome of a case. I can also imagine natural phenomena such as wind or fire affecting physical evidence and in turn affecting the outcome of an investigation. I don't perceive these things as a mystical intervention or paranormal phenomena. I see them simply as chance happenings, what I would call luck.

In our jurisdiction there was a bank robbery. Two guys pulled the job, jumped into a stolen car, drove around the corner,



transferred to another vehicle, and took off. Everyone was running up and down the county trying to catch these two.

I received a call in the lab asking me to go check out the stolen, abandoned vehicle for fingerprints. I went to the place where it was parked at the curb and began to process it for fingerprints. I recovered quite a few, and checked the glove compartment, beneath the seats, etc. for a possible abandoned weapon. I packed up my gear and was preparing to return to the lab. However, I decided to take one last look. This was a two door sedan and, as was very common in those days, there were cloth seat covers protecting the upholstery. I was at the door on the driver's side, and to recheck the rear compartment, I had to push down or fold down the backrest of the driver's seat. I did this, looked under the seats thoroughly once again, and found nothing. I straightened up, pushed the seat back vigorously into its upright position, and took a last glance. Now I was amazed to see a brown paper lunch bag resting on the floor of the rear compartment that had been clear a moment before. When I opened the bag gingerly to avoid leaving prints, I could see that it was full of money. I was a young criminalist and completely alone at that scene. I took a picture of the bag with the money showing. I didn't even want to touch it at that point. I stopped a passing citizen and had him call my office. In a few moments cars came screaming up, our guys, the FBI agents, the whole circus. They immediately reached in, grabbed the bag that I had so carefully preserved for prints, dumped the contents on the hood of the car and counted out ten thousand dollars which was just what had been stolen from the bank. As you can imagine, the bag had been stuffed under the seat cover, and had fallen out when I let the backrest return to its upright position. I'm sure the money would have been discovered eventually. But by whom? If nothing else, the discovery was swift and good for headlines, "***FBI** Recovers Stolen Loot*." And I, luckily, was saved the embarrassment that would have ensued had that bag of money not figuratively dropped into my lap.

I have no doubt at all that if it were possible to make contact with seasoned investigators, any of them, with a little thought, could come up with incidents or investigations in which luck was a critical factor. Recognition of this should in no way detract from the ability or the professional status of the investigator. In the final analysis, it still takes a good investigator to recognize and utilize whatever lucky break comes his or her way.

The *Devil's Slide* Affair

One of the most dramatic cases in my experience involving this type of luck, happened many years ago on a winding coastal highway south of the city of San Francisco at a place called Devil's Slide. The case had its beginnings in an ordinary missing persons call. A man in his mid forties had not reported for work, had not communicated with his mother, and seemed to have lost contact with all of his routine associations.

There was a normal follow up investigation that disclosed no indications of violence or foul play. Perhaps the man would turn up in a week or two. He lived a somewhat solitary life and did have a previous history of attempted suicide. At that moment, however, this was simply a missing person report. The next time we heard anything related to our missing person was about 6 to 8 weeks later. Local police in Oregon had picked up a small gang of youths from San Francisco. These people, petty thieves and street hustlers, had committed some minor felony and were all in custody. The gang had been traveling in a vehicle that was identified as having been the property of our missing person. In consideration of the possibility that the vehicle had been stolen and transported across a state line, a federal violation, the local FBI agent was informed, and our department also received notification of these events.

One of the members of the gang was a sixteen year old girl who had been sent to a youth facility. While there, talking to one of the matrons, she divulged that a fellow member of the gang had killed a man near San Francisco. Apparently the gang member, a young street hustler, had come in one evening bragging that he had just killed a man. He claimed that the guy had wanted to commit suicide but didn't have the guts to do it. So he offered the kid his car, a gun, and whatever money he had, to do the job for him. Apparently the gang leader had slapped the kid a few times for being so stupid and had taken the gun from him. Not long after, the little group had piled into the car and had driven to Oregon where they pulled several burglaries before getting caught.

The FBI agent in Oregon received the information of the purported shooting and arranged an interview with the young street hustler who had been identified by the girl. The person indicated was a skinny nineteen year old youngster who readily admitted that the story was true. When this information was then relayed to our department, detectives were sent to interview the young man. He repeated his story and even drew a crude map to indicate where the shooting took place.

The youngster described the event as follows. He and the victim left San Francisco in the victim's car and drove south along the coast highway. They came to a spot where there were steep cliffs right along the ocean. There was a lookout point at the side of the highway where they could pull the car off the road. It was night, and in the distance ahead they could see the lights of a small village or town. The guy got out of the car and went to the edge of the cliff, and that's where he was shot. The victim disappeared over the edge and the kid got into the car and returned to San Francisco.

We received this information along with a copy of the crude map drawn by the suspect in Oregon. A detective lieutenant and I, the criminalist, were assigned to try to locate the spot and, if possible, to find evidence that a crime had really occurred. We had a reasonable idea that the location was a spot known as Devil's Slide, a section of the coast highway that had a certain infamous reputation as a dangerous site. Over the years, cars had gone off the cliffs into the ocean at this point. It was a place of steep precipices with a roaring ocean and jagged rocks at the base. We believed that the lights described by the youngster could be the small town of Half Moon Bay a short distance ahead on a level stretch past the cliffs.

On a bright, clear day, the lieutenant and I accompanied by our local FBI agent drove to the coast to survey what we thought might be the scene of the crime. There we encountered a most bizarre scene, what I would call a criminalist's nightmare. Investigators know that the ideal crime scene is one that has not been contaminated, a place where there has been no intervention by humans or other creatures.

Of course, in a period of approximately eight weeks, an open scene exposed to the elements will also suffer deterioration. But still we had expectations of finding some indications of the shooting that had supposedly occurred at the site. To our dismay, when we arrived at what we had selected as our primary scene, rather than an isolated, empty landscape, we found a site humming with activity. Dozens of

people were raking the soil, smoothing out irregularities, apparently landscaping our supposed crime scene. Any evidence at this location would have been contaminated or lost. What was happening?

It appeared that a major Hollywood studio was shooting a scene for a movie starring Lana Turner and Anthony Quinn. This was "Portrait in Black". In the film, a car goes over the cliff at Devil's Slide.

It was evident that if this was indeed the scene , it was totally ruined. Nearby, around a bend, was another possible site. We went there and observed a cliff that sloped downward and then had an undercut below which we could not see.. Down on the sloping portion, we were able to observe a dark blue garment of some kind. Finding a dead tree branch and a secure foothold, the lieutenant was able to snag the garment and recover it. It was a blue knit ladies dress, dampened by intermittent rains. There were a number of holes in the dress. We thought that possibly it had been used to muffle the sound of gunfire.

The folks in Oregon discussed this with the suspect, and he admitted that he had indeed muffled the shot with a garment.

We were now fairly convinced that we had the right location. Unfortunately, the weather was miserable for the next few days with rain , fog, and gusty winds. However, a few days later, the weather broke and we had a clear, bright, sparkling day. We arrived at the scene with a pickup truck equipped with a winch and a harness that would permit an investigator to be lowered and raised on the face of the precipice. Around a bend at a strategic location we had an observer equipped with binoculars. He could see the entire face of the cliff which, because of the undercut, was out of our angle of view. With arm signals he could indicate whether to raise or lower the winch.

My partner, the lieutenant, hooked up the harness and began to slowly move across the face of the cliff. He was looking for a cartridge case, a torn piece of clothing, a button, or anything that might indicate that the body of a man had slid down that incline. Soon he was lost to our view. A short time later, we saw the observer signaling to raise the winch, and the empty harness soon appeared. There was a white scrap of paper attached to the harness as it rose, but when it reached the top, the paper had apparently become detached.

I assumed that my partner wanted me to join him down below, so I hooked myself up and went over the edge. I went back and forth laterally as I descended. I could see no evidence of the victim sliding down this slope. Now, over to my right, I saw the white scrap of paper that had evidently become separated from the harness. It had fallen on a little sandy outcropping. I moved over to pick it up and, as I bent down, I saw a minute gleam of gold. I looked more closely. It was a gold wristwatch almost covered with sand. I held it up, and as I was still in view of the top, I yelled to our photographer to photograph me in that spot. Then I bagged and tagged the watch and continued my descent.

I joined the lieutenant and we searched carefully all the way to the base of the cliff. We found no body, but we did find three mentholated cigarettes, unsmoked and clumped together as though they had fallen from a pack simultaneously. They were partially buried in sand, and we found out later that they were the brand smoked by our missing person.

Our suspect continued to serve a short stretch as a model prisoner in Oregon. When released, he went to Colorado and entered college. During this time, our investigators worked very hard to show that the victim was not alive. As his body was never found, we were unable to show that he was dead. The wristwatch discovered on the cliff had a serial number that enabled us to learn that it had been a birthday gift to the victim from his mother. The gun that was apparently used, was traced through several possessions. The gang leader had sold it to a friend who had sold it to another and it ended up at last in the hands of a person who decided to throw it into San Francisco Bay. Our good investigators obtained a description of the location near Fisherman's Wharf where the weapon had been dumped. Our divers submerged at that point, searched the bottom, and came up with the gun.

The suspect was extradited to California and was brought to trial. Even though the body of our victim was never found, the young man was convicted of manslaughter. This was an unusual case. The strongest confirmation of the accused person's confession was the wristwatch found half buried in the sand on the face of the cliff. Would I have found the watch had the torn scrap of paper not landed almost directly upon it? I doubt it. After all, my keen eyed partner hadn't seen it. As for the note, its message was far from earth shaking. It said, "Come on down Morris, the weather's fine."

The Fingerprint Card

There was a most interesting case that, in my opinion,

The Brazilian letter bomb

The Bolivian letter bomb.

was another illustration of luck in the category of time or space. I present it here as it was told to me, changing names, of course.

Back in the sixties we were having a rash of burglaries on the north side of town. Our unit was required to respond and process each burglary scene. The suspect(s) had the same method of operation, so we were pretty sure that the numerous break-ins were related.

One morning I was requested to process a residence where a burglary had just occurred. I was able to develop latent prints from a window at the point of entry. Upon arriving back at the station, I entered these latent prints into the state's AFIS system. Results were negative. At that point it was essentially the investigator's responsibility to submit the names of any possible suspects for comparison of these latent prints. I and another latent print examiner in the unit had looked at literally hundreds of possible suspect cards without an identification. Later that day, Investigator Elmer Moresby came into my office and relayed the name of a possible suspect, Charles Williams, AKA "Jailbait." As I was busy at the time, I asked Investigator Moresby to pull "Jailbait's" in-house fingerprint card and put it on my desk. Detective Moresby went to the filing cabinets and searched for Charles Williams' card that is filed in alphabetical order, pulled it, and laid the card on my desk.

About ten minutes later, I did a comparison of the latent prints from the morning's burglary with the prints on the inked file card of Charles Williams and made an identification.

I relayed the good news to Detective Moresby and I ran a copy of the fingerprint card so that he could use the information for his arrest warrant affidavit. Several minutes later, Moresby came into my office and said he had made a mistake. He had gone to pull Charles Frank Williams" (Jailbait) card and had mistakenly pulled the card of Charles Francis Williams. These are two different persons. ***He pulled the wrong card, but he pulled the one that was identified.***

We estimated that at that time we had over 100,000 fingerprint cards in our section. ***Talk about luck****!*

3. Criminal Behavior

Criminal behavior is a very large category. We do not control the behavior of the perpetrator, so as far as we are concerned, what he does or does not do can be regarded as a matter of luck. Allow me to use an illustration from an actual case.

A policeman was shot and killed on an isolated highway sometime after midnight. The officer's weapon, a .38 caliber Smith & Wesson revolver, was missing. There were no witnesses. A license plate number that had been called in to the dispatcher turned out to be a plate that had been reported stolen. A blood-spattered receipt found next to the body had a name and address that had also been written by the officer on his clipboard. However, investigation disclosed that the name and address were completely fictitious. Six bullets were recovered from the body of the officer. These had been fired from a .32 caliber Colt revolver

A tip regarding a potential suspect was received from a detective in a nearby town. This led to a successful search for a suspect who was eventually located and arrested in another state. When he was arrested, he had an ornately decorated .32 caliber Colt revolver in his possession. This weapon was examined, and fired bullets were matched successfully with the evidence bullets. The case was prosecuted and a conviction was obtained.

Sounds like a normal case, so where's the luck? Well, what if the perpetrator had decided to get rid of the revolver, which he might easily have done by simply dumping it into the ocean, or a lake, or burying it in the desert.? This was a key piece of evidence in the case. Without it, we had nothing. It turned out that the culprit was enamored of this engraved and gilded weapon and kept it, and so, luckily, we did get our opportunity to make the identification.

Most of the controversy surrounds the topic of criminal behavior as a category of luck. As I consider this, I believe that it is because a principal component of the crime scene investigation is the search for physical evidence. There are investigators who say, "The discovery of physical evidence depends wholly upon the professional capability of the investigator." My response would be, The discovery of physical evidence depends also upon the behavior of the criminal. It is his behavior that determines whether or not there is evidence available to be discovered.." It may be due to happenstance, it may be the result of his conscious behavior, or it may be ineptitude One way or another, the discovery of the physical evidence cannot occur if the evidence is not there to be discovered. Let me offer an example:

The perpetrator is wearing a pair of shoes with soles marked with abundant individual characteristics. There are cuts, breaks, wear patterns, and random marks that could enable us to arrive at a positive identification with no difficulty. Now in one scenario our perpetrator treads only on hard, rough, irregular surfaces that simply do not have the capability of recording those beautiful patterns. In a second scenario, he steps in some soft clay, leaving impressions that record the details with microscopic fidelity. We place the same investigator in both scenarios.

He is dedicated, intelligent, and professional. In the first scenario he finds no shoe prints of value. In the second, he finds shoe impressions of great evidential value. Shall we criticize the investigator in the first scenario? Shall we say that the investigator in the second scenario is more professional? No! The difference lies in a factor that is beyond the control of the investigator, namely the behavior, movements, and actions of the criminal. I like to use the word "luck" to describe that factor.

What about fingerprints? I feel as though I'm entering the lion's den when I include fingerprints in this discussion. There are those who place this kind of evidence on a sort of pedestal above other types of physical evidence. They would say, "Surely you wouldn't include fingerprints with all these other (inferior) types of evidence?" Of course I would. Fingerprints are physical evidence too, and the luck factor applies with this evidence as with all other evidence.

I'll be honest, in the days when I was doing a lot of dusting for fingerprints, I always felt a little bit lucky when I recovered prints that I was eventually able to connect with a suspect. As you might surmise, those were the days before automated or computerized search and comparison methods had been developed. Think for a moment of the factors or elements that have to be just right if the fingerprint evidence is to pan out and prove useful. First, there is skin condition. Moist materials on the friction ridges, sweat and sebaceous materials can serve to transfer the patterns. Clean, dry friction skin may contact a surface and yet leave little or no deposit. Next there is the surface. Many rough, absorbent, irregular surfaces are simply not conducive to accepting a decent or legible print. Movement and pressure must also be considered. The type of contact may be such as to leave blurry smears. Important details of pattern characteristics are simply not

visible as they might be in the case of a static contact. Time and environmental factors such as heat, rain, or passage of time may destroy useful prints. Human intervention plays an important role, too. People may superimpose their own prints or wipe away good prints unknowingly. Finally there is the matter of conscious awareness. The perpetrator may make a conscious effort to avoid leaving prints. Thus, he may use gloves or handkerchiefs to avoid leaving his prints. Or having left prints, he may make a conscious effort to wipe off any surfaces that may have been contacted.

These are at least some of the factors that could affect the possibilities of locating useful prints at a crime scene. So it is not too surprising that one might feel a little lucky if he finds, develops, and matches prints from the scene with those of a suspect.

What was it that brought the suspect to the attention of the investigator? Bear in mind that in the absence of automated search systems, it would be necessary to have the name of a suspect in order to be able to pull the fingerprint card from voluminous files. I would take nothing away from the good skills and procedures of an investigator. He would utilize his informants, his interview skills, his analytical capabilities, modus operandi files, all those things that make him a good investigator. But there are occasions where a lucky break served to bring the suspect to the attention of the detective. So, yes, there may be an element of luck even where fingerprint evidence is involved.

In the next few pages I will recall certain cases, some in which I was involved and others that have been described to me by other investigators. In each of these, we may see the presence of the luck factor. But we will be aware that almost invariably there is a good investigator available to recognize and take advantage of the lucky break.

The Cat Burglar

Some years ago in our community we experienced a plague of burglaries. I'm sure that many communities have had the same experience. It was not long before we became fairly convinced that many of these burglaries were being carried out by the same perpetrator. And we became aware that the same person was also active in several surrounding jurisdictions. There were certain indicators that led us to the conclusion that it was the same individual. The problem was that we didn't know **who** it was. There was a consistent modus operandi or operational pattern that was used, and traces were found indicating that the same person was active in the many burglaries..

At a number of burglary sites, shoe impressions were found that appeared to have been made by the same pair of shoes. These sole impressions showed a sort of cross hatch pattern that led investigators to think of the perpetrator as the "waffle shoe bandit." Cigar butts were found on occasion. These turned out to be a cheap brand available at any drug store or grocery. Had they been an unusual, imported cigar brand, they might have provided a lead through a canvassing of specialty tobacconists.

The modus operandi was fairly consistent. The burglar victimized residences rather than commercial establishments. He operated at night, under the cover of darkness and often entered through a window or balcony at the second floor level, eventually earning the name "Cat Burglar" from the local press. Many of the targeted houses were located at the edge of a large open expanse such as a country club, a park, a golf course, or other similar area. Later on, we learned the reason for this selection. Picture this, the burglarized house located at the edge of a large expanse of open ground. It is night, and the burglar parks his vehicle somewhere on the opposite edge of this expanse. Then he crosses over on foot, burglarizes the house, and carrying his often heavy loot, recrosses to where his car is parked, and drives away. All of this is done under the cover of darkness. His reasoning is simple, some alert patrolmen may check the hoods of cars parked on the street in potential target areas. If they notice that the hood is warm, indicating a recently parked car, they will jot down the license tag number. Then if the next morning, a burglary report comes in for that street, checking out the tag number could provide a great lead. So essentially his procedure was to park at some distance from the actual site of the burglary.

This pattern was sufficiently apparent so that in one town a police sergeant, one of my former students, had stationed himself at a location where he thought a burglary might occur. In fact he actually spotted the cat burglar emerging from a residence. He gave chase, but the burglar was in far better physical condition, and he disappeared in the darkness. He jumped over a fence in his flight and left a brown silk glove hooked on the fence wire. At that point we began to have our doubts that we'd have any success in the area of fingerprint identification. And now we could add to our description of the perpetrator that he was agile and strong.

During this period when all of these burglaries were occurring, I was called to process a burglary scene. The scene fit the general modus operandi of the cat burglar. I do not recall the details of what was stolen, but I do remember that it was not a messy scene such as is often encountered. However, I did notice a block of cheese on the kitchen table. Several bites had been taken, and the bite marks were visible. The lady of the house informed me that the cheese had been in the refrigerator, unbitten. So I bagged this as evidence and brought it back to the crime lab. At the lab I made some silicone rubber casts of the teeth impressions and placed the cheese itself in our storage refrigerator.

I had noticed one curious aspect of these bite marks. The lower incisors had left their distinct markings. However, there were no upper teeth marks. The upper portion of the bite had been made by the gums. Whoever had bitten the cheese appeared to be edentulous, with no teeth, at least in the upper part of the mouth.

Time passed. Each day we confronted the usual gamut of illegal and violent acts, and we were no closer to discovering the identity of our elusive cat burglar. Then one night an event occurred that was to provide the break that we needed. It may have been a lucky break, but it was most certainly the result of good patrol procedure. In the early hours of the morning, long before dawn, a radio patrol unit cruising on some of the back roads of the county, observed a vehicle parked on a lonely lane. Out of curiosity and with the thought in mind that possibly this was an abandoned stolen vehicle, the patrolman turned into the lane and slowly approached the vehicle. To his surprise, the car started up and burned rubber as it fled at high speed. The patrol unit pursued with lights and siren, and the driver of the escaping vehicle lost control and ended up in a ditch at the side of the road. In the car were a man and a young woman. They were brought into the station and questioned separately. The vehicle was impounded and brought into the storage compound. While detectives

questioned the pair, another investigator examined the vehicle and, in the trunk of the car, made a discovery that resulted in a telephone call to my home.

At about 4:00 a.m. the phone rang next to my bed. I awoke, fumbled for my glasses, and answered the call. It was the station. Could I come there immediately? They had discovered some shoes in the car of a suspect. These shoes had a waffle pattern on the soles. This guy could be the cat burglar. Could I get down to headquarters and compare the shoes with photos or casts that we had from several cat burglar cases?

I hurriedly threw on some clothes and drove down to the office. I received the shoes and began to make comparison examinations. The shoes appeared to be the same size as indicated by the evidence patterns. What's more, the patterns were the same. There was one serious problem, however. Over an interval of time, the shoes had been used to the degree that any details on our evidential prints had been worn away. As I wrote in my report, it was possible that these were the shoes that had left the impressions, but I could not state positively that they were.

The detective assigned to the case was disappointed. However, taking a copy of the report, he went to the interview room and declared to his partner who was trying to get some admission from the suspect, "*Don't waste your time with this guy. We've got him cold.*" The partner asked, "*Why? What's happened*?" The detective responded that the laboratory had made a positive identification of the shoes.

The "Waffle-Shoe" Bandit

With this news, the suspect confessed to the many burglaries and disclosed where he had a cache containing many stolen articles. Our cat burglary cases were effectively resolved. As I recall we closed about 100 burglary cases with this one arrest, and investigators from surrounding jurisdictions were waiting in line to interview this guy and close their cases. The fact is, however, that we had no good physical evidence placing this suspect at the crime scene.

At this point, I remembered the case where I had found the partially eaten cheese. Perhaps we might make a positive match with dental impressions. Interestingly, the suspect had an upper dental plate that apparently was so uncomfortable that he seldom wore it. I bought a block of cheddar cheese at the grocery store and sent it to the jail where it was offered to our suspect. He was allowed to take several bites, and the cheese was recovered and delivered to me. At this time, I made silicone casts of the bite marks that, incidentally, showed an absence of upper teeth. When I compared these casts with the casts taken from the cheese recovered from our long ago burglary, I was able to make a very positive comparison.

From my point of view there were some lucky elements in this case. The patrolman who arrested the cat burglar did not contemplate that arrest. He was alert and doing his job and his performance was excellent. I would simply say that the outcome of his actions was not anything that he might have expected. The behavior of the burglar in biting the cheese ultimately served to our advantage. If he had not been hungry, if he did not like cheese, or if he had been hungry enough to finish eating the entire piece of cheese, we would never have recovered this evidence.

The Wrong Hammer

The city of San Francisco has always seemed to have its share of colorful characters. And during the period I worked and lived in that area I recall several who were part of the culture of that day. One was a radio host named Don Sherwood who livened up the early morning commute with his fresh and humorous approach to the current scene. Assisting Sherwood was his friend Hap Harper, an airplane pilot who was also the owner of a private airfield located in our county that was adjacent to San Francisco. During the morning commuter rush hour, Hap Harper would fly a light plane over the city and its environs. Over the radio, he would describe the traffic patterns, accident zones, bottlenecks, and alternate routes. This interlude was an important part of Sherwood's morning broadcast and was a great boon to the harried Bay Area commuters.

One night the Harper airport was burglarized and items were stolen from a vending counter. The office was ransacked and blank checks were stolen. Even the radio communication equipment used by Harper to communicate with Sherwood during his morning broadcast was stolen. The commuting drivers had to find their own ways through the maze and the confusion of the morning rush hour.

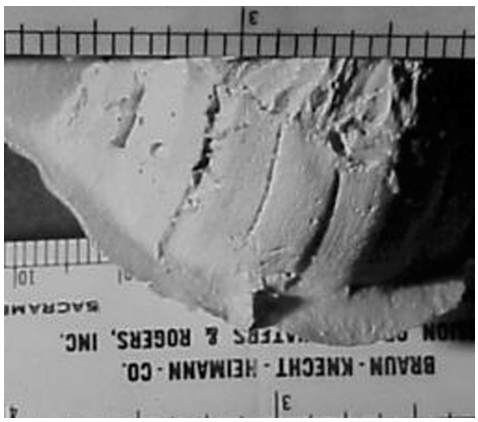
I examined this burglarized airport scene and focused my major effort in the area of the business office. Blank checks had been stolen as well as some business machines and miscellaneous materials. An attempt had been made to break into the safe. The safe dial had been knocked off with some hammering instrument, and an effort had been made to peel the back of the safe. Hinge pins had been removed from the safe door.

I smile as I recall a humorous little episode associated with this crime scene. While I dusted the safe for fingerprints,

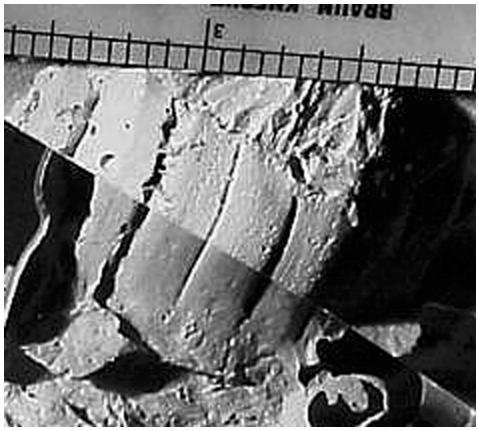
an accountant or insurance representative hovered nearby, anxious to determine the extent of losses. As I finished my print search, I tugged on the heavy safe door. My good reflexes allowed me to leap out of the way and avoid a fractured shin as the massive door came crashing to the floor. I believe that the safe door had been unlocked the whole time. Inside the safe there were several thousand dollars in cash. I seem to recall they printed all this in the local newspapers just to make the burglar feel bad over his missed opportunity!

Naturally, I collected broken fragments from the safe dial. These could conceivably be useful for the development of tool mark evidence in the event that our investigators should come up with a good suspect. One of these fragments was the dial knob bearing impressions of blows with a heavy instrument. Also, there were several fragments of broken cast iron from the inner mechanism of the dial knob. These had the toothed appearance of a gear wheel or cog wheel. At the moment I collected them, I really did not anticipate that they would be of any significance. I collected them simply because they were there.

About two days later, a man was arrested in connection with this burglary. He was caught in the act of passing checks that had been stolen during the burglary. Although he admitted passing the checks, he denied any knowledge of the burglary itself. How did he obtain the checks? He had met some guy in a bar. This fellow gave him some checks to cash and told him he could have half of any money obtained in this effort, and no, he didn't know the guy's name.



Cast of teeth marks found in cheese at crime scene.



Cast of teeth. marks from cheese bitten in jail(bottom) superimposed over teeth marks from crime scene.

The check passer was driving a sporty little European convertible, and when the car was searched, investigators recovered an assortment of tools. Included amongst these was an unusual hammer, actually a copper mallet. My understanding was that this mallet was used specifically to knock off the hub cap or spindle that was a sort of spinner permitting a quick release for a wheel change during a sports car rally or race. The soft copper would be unlikely to mar the harder metal of the hub cap spinner.

I received this mallet in the laboratory and began to explore the possibility that it had been used to knock off the dial knob. I had originally thought that the indentation on the knob would prove to be a useful mark. But as I examined it closely, I found it to be less promising than I had anticipated. However, as I now examined the small cast iron gear fragments, I found that there was a coppery burnishing visible on the gear teeth. Could this be a transfer from the striking instrument? The copper mallet was now scrutinized. I noted that the face of the mallet was full of flaws and impact marks. On one area I was able to note something like teeth marks. These were photographed and when placed in juxtaposition with one of the cast iron fragments from the safe dial, there was an excellent correspondence.

When confronted with this evidence, the suspect confessed and led investigators to the stolen loot. The radio communication gear was quickly returned to service, and our department received some wonderful, free, airtime publicity from the ebullient Don Sherwood and the now happy Hap Harper.

This was a somewhat unusual tool mark match. In the typical examination, the tool leaves a mark or impression on the attacked surface. This is normal since the tool is usually harder than the surface material. In this case, however, the mallet was softer than the cast iron, and therefore it was the tool that received the mark. If the subject had used a steel hammer, it is very possible that I would have been unable to make a positive match. My good luck was that the perpetrator chose the wrong hammer.

How intelligent are criminals? Some do some very stupid things. Others may be quite bright. I remember from long ago criminology classes that studies done in some prison populations indicated that the average criminal's IQ was about the same as that of the general population. My own perception would be that the criminal is not as bright. I would imagine also that there is a great variation when we refer to different categories of crime. I know this at least, that many criminals do learn and they improve their capabilities. They learn from experience and they learn from their prison associations.

I recall one burglar who, in my estimation, was one of the best in his profession. And he did indeed consider himself a professional. Here is his story and the tale of the little factor that proved his undoing on the occasion that I shall describe.

Some Extra Leverage

A small, rather affluent town in our county had been experiencing a rash of burglaries, apparently carried out by the same perpetrator. His modus operandi seemed to set him in a class by himself. When I first heard of him, the description appeared to be that of a professional burglar.

I would say that basically it was the neatness of his work that impressed me the most. I learned that he never trashed

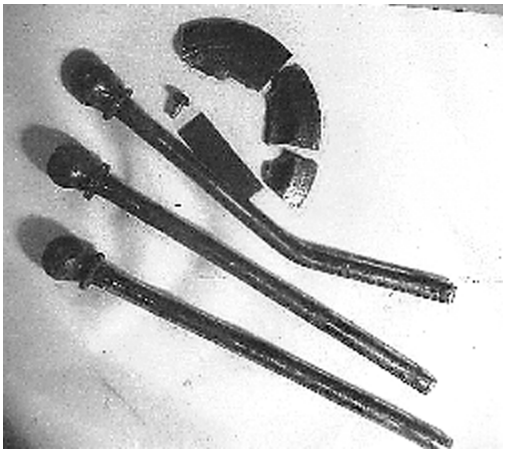
the site. Everything was restored essentially to its original position. On several occasions the victims did not even realize that they had been burglarized until some time had passed. Looking for some particular item or jewel, they learned that perhaps a number of objects were gone and that the security of the house had been breached. Having processed so many burglaries where the scene was one of scattered disorder, I even came to have a sneaking admiration for this cool and workmanlike burglar.

Of course the citizens and the police of this small city did not share any kind of positive feelings about this predator. Finally, through an informant, the investigators did get a lead on a possible suspect. This was a man who had arrived in town recently; a man who had apparently served time in a prison in a nearby state. This was a guy with nerves of steel and brass testicles from what I could gather. It appears that a local policeman, in an effort to obtain more information, had stopped the suspect's vehicle with some justification and was using this opportunity to question the man. When he asked the man about his occupation, the response was, "**I'm a professional thief**."

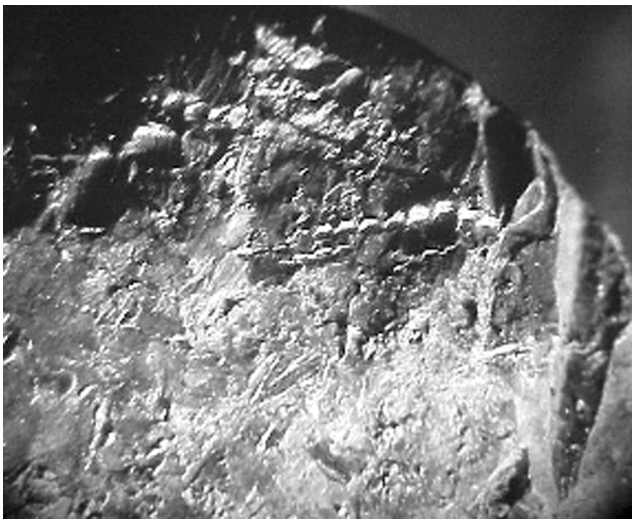
One day there was another traffic stop. This same suspect was apprehended with an opened bottle of liquor in his car. This was a violation that allowed the police to hold him for a period of two or three days and to impound and search his car. In the vehicle a bag of tools was located. At this time I received a call requesting me to lend a hand in this case. I would accompany the detectives and visit several of the most recently burglarized locations. My intention was to examine and recover tool marks and, in the short time available, compare them with the tools found in the suspect's car.

When I was shown the tools, my heart sank. These were beautiful instruments. They had each been filed, polished, and burnished to a glossy sheen. I could see that this was a real professional thief. He had learned to use his tools and keep them too. I believe that after each use he would polish these instruments so that any identifiable individual characteristics would be removed or changed beyond recognition. Matching these tools with evidence marks would probably prove to be a hopeless exercise.

With diminished hopes, we started on our round of visits to recent burglary sites. Soon we arrived at a house where the entry had been made through a bathroom window. The window was of the sash type that opens by sliding up. At the top of the window frame is a locking mechanism. The burglar gains entry by inserting the blade of an instrument in the narrow gap between the base of the window frame and the window sill. These were of wood fabrication in this instance. He applies leverage, forcing the window upwards until the locking mechanism breaks or gives way.



Safe dial and assorted fragments recovered from the burglary scene.



One of the areas of the striking surface of the hammer. Note the teethlike markings.

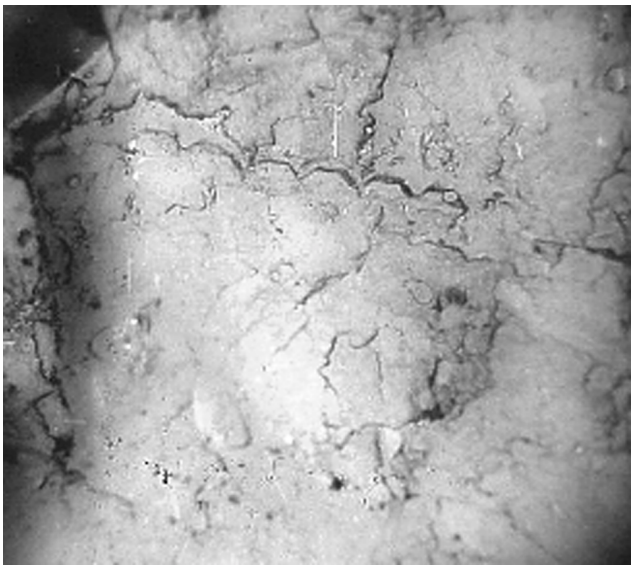
On the window sill and on the under surface of the window frame we located impressions indicating that such a prying technique had been used. The impressions were helpful in establishing the width of the tool as well as its shape. First examination indicated that the impressions lacked the typical irregular features that are so helpful in allowing us to arrive at conclusions of identity when compared with suspect instruments. Shape and size, however, may still be useful in determining which tool might possibly have been used. In this case, the one instrument that fit these characteristics was a cold chisel about five inches in length with a blade about one half inch wide.

Having recorded the scene, we made casts of the impressions using silicone rubber. These casts were brought back to the laboratory for close examination and comparison with suspect tools.

The examination proved the marks to be essentially without individual characteristics that would be useful in identification. I was about ready to throw in the towel on this particular case when I examined a small indentation obtained from the underside of the window frame. As I looked at this under the stereo microscope, I thought I could see the letters D and E. I examined the cold chisel blade. No such letters. Then I looked at the butt end, the hand grip portion of the tool. There. Stamped in the steel was MADE IN USA. The DE on the impression from the wood frame matched these letters perfectly. Now I could see that the corners of the chisel had a slight bevel and those edges had been finished by a filing process. There were recognizable striations visible and

available for comparison. A positive comparison was made in this case.

Stolen loot was recovered and a number of burglary cases were closed by this arrest. In retrospect, I could see what had happened to interrupt the success of a really competent thief. He had inserted the blade of the chisel several times and had pried upward with no success. The problem was that he could not exert sufficient leverage to break the latching mechanism. However, he now had created a larger gap at the bottom, so he reversed the tool and inserted the thicker butt end in the gap and was now able to apply what was sufficient leverage to do the job. The need for more leverage was the lucky break that helped us succeed in our investigation.



A silicone rubber cast was made of the hammer head surface. The viewer may note the distinctive markings of what appear to be gear teeth.

One of the cast iron fragments from the crime scene is placed next to the silicone rubber cast. The viewer can observe the similarity of form and size of the gear teeth and the marks from the hammer head'

A Criminal of a Different Class

Getting a call at 4 o'clock in the morning was not such an unusual occurrence. I didn't relish getting out of a warm bed, but I loved my job, and my boss and the people I worked with were great. Besides, although I never knew what to expect, it was bound to be something challenging.

On this morning, I tumbled out of bed, threw some clothes on, swallowed a quick cup of coffee, and drove the crime scene van to the address they had given me. It was about 30 minutes down the peninsula from my house, a private residence in a well to do sector of a small community. Upon my arrival, I noted that there were uniformed and plainclothes personnel at the scene, and the detective in charge filled me in on what had happened.

The house was a very pleasant dwelling. The family consisted of a man, his wife , and their 17 year old daughter. The man and his wife had left on a short business trip the previous day. The daughter would be by herself that night. This was no big deal, as she was a capable young lady. Unfortunately, at some time after midnight, when the girl was asleep, an intruder entered the house. He cut the telephone line before entering, which indicated some degree of experience. I believe that his intent was to burglarize the house. Perhaps he had surveilled the place and observed the parents leave for their trip. However, once inside, he must have observed the girl asleep. He overpowered her, cut her face and breasts, and raped her. Then he also burglarized the house. Some time after he had left the residence, he called the police and left a brief message saying that there was a girl who needed help at such and such address. I don't think that the call was prompted by sentiments of mercy. I imagine that the perpetrator simply didn't want the girl to die. Should that happen, he would be involved in a murder.

By the time I arrived, the young victim had already been transported to the hospital. She did eventually recover, but was unable to provide any description of her assailant. The usual procedures of crime scene processing were carried out. We recorded the scene and collected evidence. I dusted for prints and collected many. After all this was a lived in house. There were many blood stains on the bed sheets, and one of the stains on the pillow case appeared to deviate from the random flow patterns of the other stains.

Later in the day, investigators located a pair of cotton gloves discarded in the street gutter a block or two away.. These gloves had blood stains. When I compared these stains to those on the pillow case, I found a perfect mirror image match between a stain on the left hand glove and a stain on the pillow case. It was evident that the perpetrator had worn gloves during his attack. Our hopes of an eventual fingerprint match had diminished.

We were able to identify the point of entry into the house. This was a sliding glass door that led in from the patio. The door had an aluminum frame and a flimsy locking mechanism. A small prying instrument had been used to break this latch, and I was able to locate some small striated tool marks near

the lock. These were photographed, measured and a silicone rubber cast was made.

This was a vicious crime that shocked the neighborhood, and our investigators used all of their resources trying to get a lead on a possible suspect, to no avail. Days, weeks, and several months passed with no glimmer of a clue to the identity of the assailant. About three months after this event, there was another rape in our area. Investigators thought that this could be the same malefactor. Again, because of darkness and a stocking mask, the victim had no useful description of the attacker. And in another three or four months a third rape occurred carried out possibly by the same protagonist.

Investigators were stymied. None of the victims could render a description. All previous rape offenders in our area had been checked and rechecked. Informants had come up with nothing. But our guys were not going to abandon this case, ever.

Our lucky break came one day, as it often does, in a totally unexpected way.

FBI agents in our region had been trying to track down a guy who supposedly had been involved in two bank robberies in the East Bay. They received information that he was now in our county, and they planned to arrest him. I don't really know the details, but our investigators would participate in the action. The arrest was made, and I believe that it involved a car stop. So the car was also impounded. When the suspect was arrested, he had a handgun in his possession. This gun was to provide the break in our rape case investigation.

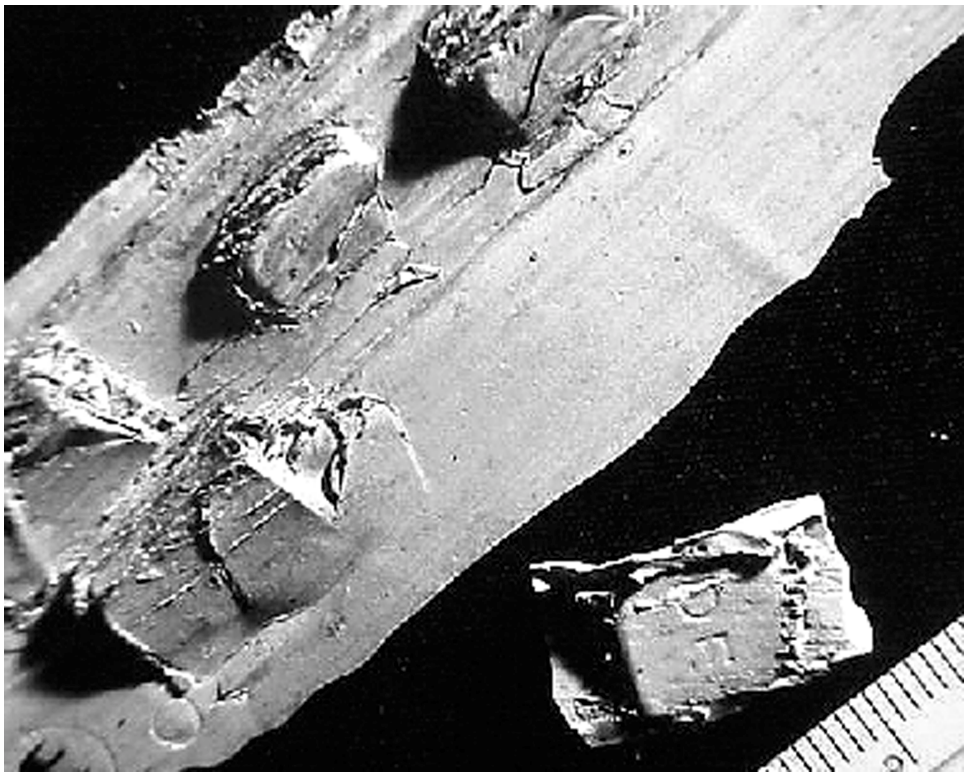
First I must explain that none of us even suspected that there would be a connection between this subject and the case that had not left our minds for six months or more. This guy was a bank robber. The person we were looking for was a burglar and rapist. Now I must admit that there is a strong tendency to classify criminals based upon the kinds of crimes that they commit. Burglars rip-off houses, counterfeiters do their money thing, pederasts target children as their victims. It's a kind of informal classification that may even be formally established in modus operandi files or archives. So it was not surprising that no one thought to make the connection between this bank robber and our burglar/rapist.

Except for one circumstance! The gun that was found in the possession of the newly arrested bank robber was found to be a stolen weapon. It had been stolen in the burglary of a physician's house. *The physician's house was located on the same block where the burglary/rape had occurred. And the burglary of the physician's house had taken place at approximately the same time period when the young girl had been so brutally raped.*

Could it be possible that this guy was working this neighborhood; that he burglarized both houses?

The car that had been impounded was searched for other weapons or evidence. Police found a leather satchel full of tools. This was brought in to the laboratory where I inventoried the contents. I recall that there were approximately 70 different tools in the bag. Now my task was to carry out a preliminary elimination; to select those tools that might conceivably have been used to open the sliding door. I still had the casts of the scratch marks taken from the aluminum door frame. Perhaps now I would be able to make comparisons with some of these suspect tools.

The evidence marks from the point of entry at the crime scene six months earlier had indicated a tool with a narrow blade width of about 1/4 inch. In the bag of tools, there was a small screwdriver that had a 1/4 inch blade tip. Using a thin sheet of lead, I began to make a series of scratches, using both sides of the blade, applying differing degrees of pressure, and holding the screwdriver at various angles. Then, making silicone rubber casts of these marks, I could begin to compare these test marks with the casts of the evidence marks from the sliding door.



Cast of tool marks on the window sill. Note lower right. DE from butt end of chisel.

Every tool, particularly when it has been used and subjected to wear, has its own minute irregularities that in effect represent its unique identity. We compare evidence marks and test marks under the lenses of a comparison microscope, and look to see if we can observe the same pattern of minute striations in both of the marks. If we can see such similarities, it is then possible to arrive at the conclusion that both marks were made by the same instrument.

I must admit that I felt a certain amount of joy when I peered through the comparison microscope and saw a beautiful correspondence of the minute details of the two marks. I would have no hesitation in reporting that this little screwdriver had

been the instrument used to open the sliding glass door on that night six months earlier.

Evidence / Test

The reader might be interested in the outcome of this very intriguing case. Our suspect was in federal hands and was sent to trial in federal court. He was convicted and sentenced to fifteen years in federal prison. In the meantime, I myself had joined the federal ranks and was in Washington D.C. when I received a summons to testify in this case. I traveled to California and presented my testimony when I was called. The tool mark was crucial evidence as you might expect. In the cross examination, the defense attorney asked me if I had ever made a screwdriver. When I answered in the negative, he made a motion to exclude the evidence. Since I had never made a screwdriver, how could I be competent to testify regarding screwdriver markings?

The judge, however, permitted me to explain how the general principle of individuality applied to screwdrivers as well as to any other instruments. And with this explanation, the evidence was accepted by the court. (Following the trial, a court official, with tongue-in-cheek, explained to me how a screwdriver can be made with vodka and orange juice.)

The third of the three rapes laid at the feet of this same offender had an interesting lucky element. This was not used in the trial, and like most lucky events also involved a good police action.

Late at night a young couple were in a vehicle parked in a trysting place or lover's lane. A man appeared at the side of the car. He was armed with a pistol. There was a bandanna or stocking masking his face. The young man was forced into the trunk of the vehicle and the young woman was then raped. No shots were fired, and no useful description was available.

Some days after this event, two highway patrolmen arranged for a meeting to exchange some information or transfer some item. The convenient location for the rendezvous just happened to be the same spot where the rape had recently occurred. As one patrolman got out of his unit and walked over to his colleague's car, he happened to notice a cartridge case lying on the ground. It was a .32 caliber shell, and for some reason he decided to collect it. He made a note of it and drew a small sketch describing its position.

I received this in the lab, recorded it , and saved it.

I had not been involved in the recent rape investigation and was not aware of any recent shooting involving a .32 cal. pistol, so all I could do was file this away. It was likely that someone was simply doing some practice shooting at the isolated spot. In fact, it was common to find spent shells in that area, usually cal. .22 or .38. Probably the reason that the patrol officer picked it up was that .32 cal. was less common. However, at that moment there was nothing I could do with the empty shell but store it.

Now we had a suspect arrested and we had good evidence of his involvement in the earlier rape /burglary. Investigators also thought that he might have been involved in the lover's lane rape. At that time, I recalled the fired .32 cal. shell. It had been found shortly after that rape at the very site where it had occurred. Could it have come from the assailant's gun even though the gun had not been fired? We received authorization to examine that weapon that was in custody of the federal court. I went to San Francisco and under observation of the custodial authorities I fired the suspect's gun into the water tank at the S.F.P.D. crime laboratory. The expended shells were collected. To my surprise, I was able to make a very good match with the empty shell case recovered some time previously by the Highway Patrol officer at the site of one of the rapes. I can only imagine that the culprit had fired the gun at some time and had placed empty shells in his pocket. When he pulled out the bandanna or mask, it is possible that the cartridge case tumbled to the ground. Of course, one might think of many other possible explanations.

In this case, the young woman victim identified the suspect by his voice and he was convicted of this and a third rape. He received sentences of fifteen years for each of the rapes. These were to be served consecutively in the state penitentiary once he had completed his fifteen year federal term.

I know that there are investigators who will not accept that there is such a thing as luck in an investigation. But I feel certain that if this criminal had not, luckily for us, been carrying a stolen gun at the time of his arrest, there would be three rape cases on the books still unsolved after all these years.

Delayed Investigation

As I explore the role of luck in the investigation, I have been mentally revisiting cases that occurred many years ago. I have no file cabinets full of records, just memories of those past events. Fortunately I do have copies of some photographs that I saved out of interest. Searching through my memories, I try to identify lucky factors that were important in achieving successful conclusions in the investigations. At this moment I am thinking of an investigation that was particularly interesting because it took place some ten years after the event.

The event was the death of a young man. I know little of the circumstances of the case. At the time it was considered to be either suicide or accidental death by gunfire. This took place in a small community, and the investigation was not a rigorous one. When I was called into the investigation some ten years after the event, I saw no photographs, no crime scene sketches, not even a written report, although I am sure that one existed.

The sergeant who had been in charge of the case was retired and apparently not available. The mother of the victim, the only witness, was now in a state of advanced senility and beyond contributing anything to the present inquiry. A .30 cal. carbine that had been found at the scene and was believed to have been the firearm used, was long gone and no one seemed to know where.

Apparently, the young man, recently discharged from the navy, lived at his mother's house, a modest working class residence. In the back yard was a utility outbuilding used for storage, yard tools, and as a miscellaneous workshop. There was also a photo darkroom, as photography was one of his hobbies.

At this particular time, the son was out in the workshop apparently cleaning the carbine. The mother was in the kitchen at the sink. In front of her was a window that provides a direct view of the workshop in the back yard. She heard a shot. I don't know if there was any delay, but she went out and found her son dead on the floor of the workshop. The carbine was apparently on the floor. There was no other person reported present at the time. Although the investigation and crime scene work would appear to be perfunctory or nonexistent, it did appear to be fairly obvious that no other person had been involved.

The problem was that ten years later a young woman had come forth with the claim that she had been responsible for the death of the victim. When asked to provide details, she described a situation in which she was facing him and had fired a revolver at him. For many reasons this description appeared to be a fabrication, but nevertheless an investigation had to be carried out.

An exhumation was conducted and, when the victim's remains were examined, the pathologist found that there was a bullet entry point at the right base of the skull behind the right ear. The trajectory was upward, forward, and inclined to the left, exiting from the upper left forward part of the skull. This was totally inconsistent with the story that the young woman had propounded. The bullet had fragmented within the cranium, and the pathologist had now recovered fragments of lead and copper jacket. These were turned over to me.

It was now my responsibility to examine the scene; to confirm or refute the story that had been submitted by the young woman.

Upon arriving at the scene, I noted that the workshop structure, although still standing, was in a woefully decrepit condition. My objective was to look for any evidence of bullet fragment impact, anything that would help me to establish the trajectory of the shot that killed the young victim ten years earlier.

As I entered the decaying structure, the floor creaked and bent ominously under my tread. I could only hope that the building wouldn't collapse while I was in it.

The wound had been a perforating one with entrance and exit. The bullet had fragmented inside of the cranium. If the shot had been fired in a horizontal direction as indicated by the young woman who was now claiming responsibility, then we should find fragments embedded in the walls. A close search was conducted, and no such fragments were found. Of course it was conceivable that the fragments had gone out through a window. However, there had been no indication of a broken window. As the exhumed remains of the victim had indicated a trajectory more inclined toward the vertical, we now examined the ceiling of the shack. There, near a point where there had in the past been a light bulb suspended, I noted a few small perforations that could conceivably be holes caused by bullet fragments. The position of these holes was measured and sketched.

When the ceiling panels were carefully examined, we could see fragments of lead and copper jacketing lying on the upper surface as though they had penetrated, struck the wooden roof structure, and fallen back on the top of the ceiling board. As the panels were carefully removed, we recovered the bullet fragments. Now, examining the wooden roofing structure, one could see that fragments had grazed and tunneled through a wooden beam and had penetrated into the roofing material.

Fragments embedded in the shingles were recovered. Our good fortune was that the beam or rafter bore an elongated scratch as well as a small tunnel created by moving bullet fragments. These could be extended to establish the trajectory of the fragments that had created the markings. We could now determine that the fragmented bullet had followed a trajectory that was about thirty degrees from the vertical. This was sketched, and with accurate measurements a three dimensional model was prepared to present to the court, in this case a coroner's jury.

When I was a student of Criminalistics at the University of California, our professor was Dr. Paul Kirk. I think it is correct to state that Dr. Kirk was the father of criminalistics in the state of California. I remember that he would stress many times that physical evidence **does not lie. It does not make mistakes, and it does not forget!** I have often thought of this last attribute as I reviewed this case. A victim's body lies in the cemetery for ten years and is then exhumed. The pathologist, carrying out a belated autopsy discovers fragments of a fired bullet inside of the skull of the victim. Ten years after the fact, I have the opportunity of examining a dilapidated ruin of a utility outbuilding. I discover fragments of a fired bullet in the roofing of this structure. Would it be possible to determine that the fragments in the roof originated from the same bullet that killed the victim?

At this time, I examined the fragments from the exhumed body and began to compare them with fragments removed from the roof. As I manipulated the fragments under a stereo microscope, I began to realize that indeed there appeared to be a sort of jigsaw puzzle match between a copper fragment from the autopsy and one from the ceiling. Yes, they had been part of the same jacketed bullet.

Now we could arrive at a solid conclusion. The bullet that had killed the young man had been fired at an upward,

The comparison microscope view. An excellent coincidence of the striations on the evidence mark and the test mark. At the right can be seen the test mark made on a lead sheet. This was made with a screwdriver with a 1/4 inch blade which was in the tool bag found in the suspect's car. The horizontal lines are the microstriations caused by irregularities of the blade.

close to vertical angle. There were far more holes in confession of the young woman than there were in the skull of the victim.

When our accumulated information was presented to the Coroner's Jury, the conclusion was that the young man had died of an accidental gunshot. The young woman had presented considerable mental instability by this time. She had felt responsible indeed for the young man's death. She felt that he had committed suicide because of personal problems between them. She had, however, invented or imagined the actual details of the shooting that were totally inconsistent with the story told to us by the physical evidence. She was ,in fact remanded to an institution to receive psychiatric care.

I will never know what actually happened. I can only conjecture. It may be that details in long moldering records could further clarify the events. However, here is my idea of what might have happened.

The victim is preparing to clean his carbine that is supposedly unloaded, but in fact is loaded. He goes into the photo dark room to get some item of cleaning material. He walks out into the lighted room. He is quite tall and he walks right into a bare light bulb suspended from the ceiling. The bulb breaks with a small explosion. He ducks away from it reflexively. The carbine butt strikes the floor, or his finger may be in the trigger guard. His head is turned away as the weapon is discharged. It fires upward, the shot striking him at the right side of the skull base.

To me the lucky element in this investigation was the fact that the backyard utility building was still standing. Under normal conditions, I would imagine that it would have been demolished or rebuilt. I suppose that the deteriorating condition of the mother resulted in the understandable lack of maintenance or attention. In any case, I did have the chance to locate the fragmentary evidence that was so important in permitting us to reconstruct the events of that long ago tragic day.

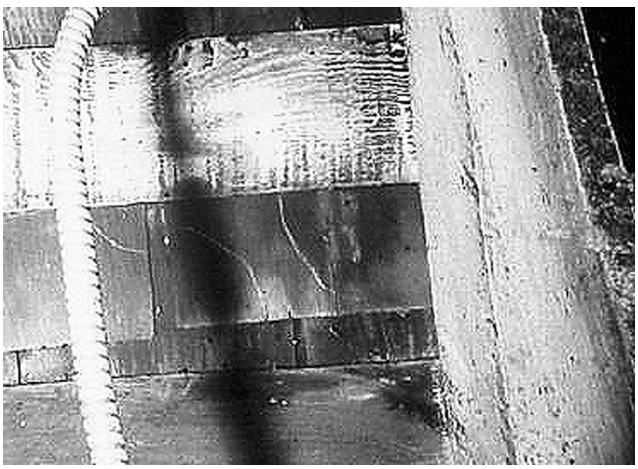
Controversial Nature of "Luck" in the Investigation

Over the years, I have thought a great deal about the element of luck in an investigation. Only recently have I begun to try to organize my thoughts and formalize whatever concepts I had relating to this subject. As I began to discuss this with other investigators, I was surprised to discover that the mere idea of luck as a factor in the investigation was very controversial. Whereas some investigators seemed to agree with me and recognized immediately that luck indeed had a significant role to play, others rejected the idea and even became incensed at the suggestion.

I could sympathize with this latter reaction. There is the feeling that the professional status of the investigator would be diminished and subverted by the acceptance of luck as a factor in the investigation. Luck is correctly perceived as an

Front view, dwelling

View of utility shack as seen from kitchen of the house.

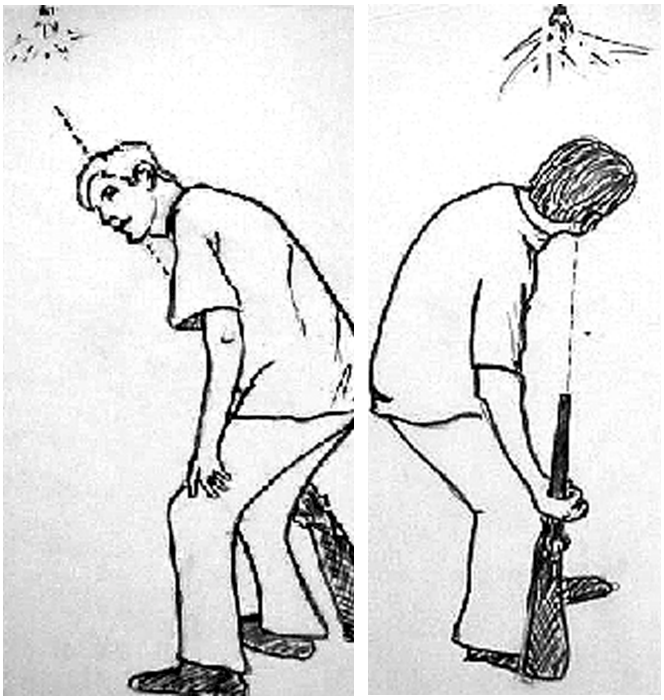


Note penciled lines on shingles indicating where fragments have penetrated. Note gouge on beam caused by fragment.

element completely beyond the control of the investigator. Others might conclude that if he succeeded, he was lucky. If he failed, he was unlucky. And a competent, professional investigator is naturally reluctant to accept that kind of judgement. He would certainly prefer to live in a world where success is recognized to be the result of his competence and professionalism rather than blind luck.

Yet, in my point of view, the coexistence of luck and competent professionalism in the investigation is not at all inconsistent. To the contrary, I believe that it is the competent investigator who is alert and takes advantage of the lucky event or circumstance. Whether or not there are fortuitous factors, the conscientious, well trained investigator will achieve success more than the lackadaisical timeserver.

Without question, my own experience has led me to accept luck as an important factor in the successful investigation of many criminal cases. And I am convinced that if it were possible to analyze each successful investigation, we would discover that a lucky circumstance exists in many of them.



Two views of the imagined position of the victim at the time of the shooting.

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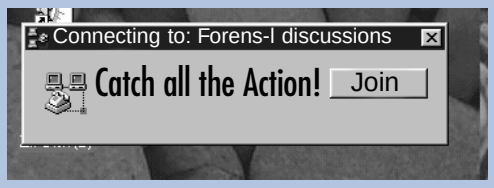

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