The CACNews

News of the California Association of Criminalists • First Quarter 2000

Peering Into Our Future

Essays by Raymond Davis • Stuart Kind • Richard Saferstein • Jerry Chisum • Greg Matheson • Carol Hunter • Keith Inman • Ken Goddard • Bob Blackledge • Frank Cassidy • Peter Barnett • Norah Rudin • David Stoney

HIRAM EVANS

None too shabby a list

At the end of each year, most of us pause, however fleetingly, to reflect on the closing year. To many, this is the final year of the Millenium, cause perhaps to reflect on a somewhat longer period. As I noted in my first message as president, I'm one of those curmudgeons who thinks the Millenium ENDS with 2000, rather than 1999. That fact not withstanding, I have this opportunity to reflect upon the Association's goals at its foundation and our progress over the intervening 48 years. The California Association of Criminalists was founded to:

Foster exchange of ideas and information, the raison d'être of Seminars, *Science and Justice*, and the *CAC News*,

Foster friendship and cooperation. 'Networking' is the buzz word, but no matter what words are used, it's nice to know somebody in such and such a laboratory, to be able to commiserate with someone in the same boat, or to put the world in perspective when someone else's backlogs are bigger than yours or turnaround expectations make yours look comfortable,

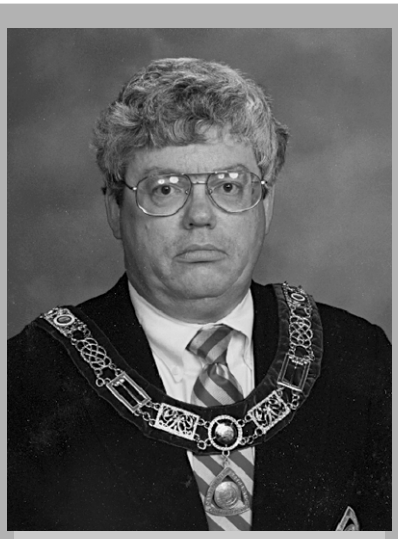
Stimulate research and development, if not driven by casework alone, an indirect effect of seminars,

Encourage the financial support of worthy research projects, a reality thanks to the McLaughlin Endowment,

Encourage compilation of experience data of value to the field, that comfort in knowing somebody has probably been in the same pickle in which you find yourself, at some time in the past, or more scientifically all those databases with which we ascribe significance to analytical results,

Promote wide recognition of the practice of criminalistics, by whatever means, the profession of forensic science has far greater recognition by the public than it has previously to the point of getting the attention of the California Legislature (see accompanying article on Proposition 115),

Promote high level of professional competence, among other ways, through certification that was literally started by CAC, encourage uniform qualifications and requirements, a subtle influence, perhaps, but still present,



I have this opportunity to reflect upon the Association's goals at its foundation and our progress over the intervening 48 years.

Disseminate information to law profession regarding minimum qualifications for consultants, again accomplished through accreditation and certification, relatively unique in that consultants have always been an integral part of this Association in which the bulk of practitioners are public employees,

Provide board of review in cases, too often prevented by the adversarial nature of the law,

Encourage use of improved testing procedures, primarily by making them known to practitioners though Seminars and publication,

Encourage recognition of this Association, while recognized by the State of California in the alcohol analysis legislation and that which established CCI,

Lend assistance in the formation of curricula

Review and act upon legislation, a area of immediate importance in regard to Proposition 115 and of continuing concern with Title 17

Establish, maintain and enforce code of ethics, probably the place where this Association is head and shoulders above others is the detail in our Code

Establish, maintain, manage an Endowment, through which the Association has been able to provide workshops, research, training, and scholarships and

Establish, offer, and administer a certificate testing program, while supplanted administratively by ABC, CAC's participation is both broad and in depth with members on the ABC Board of Directors, Board of Examination, and widely participating in individual disciplines.

None too shabby a list of goals, an enviable record of accomplishment, a challenge for the future...

From the desk of
Nancy McCombs

Criminalistics 2000

When the call for essays went out, I was concerned that we wouldn't get much response by deadline. I needn't have worried. Nearly everyone we contacted replied with great interest in the project. Our profession is fortunate indeed to count among its members some of the most thoughtful people around. I know I speak for the membership in extending my thanks to all of those who shared in making this quarter's issue a truly special one.

Each author was given no direction other than to comment upon the future of the profession of criminalistics. What we received is presented here for your illumination and reflection. Within these pages you'll find a marvelous tapestry of ideas; a collage of viewpoints that will surely provoke discussion and stimulate your imagination. Enjoy.

www.cacnews.org

it's just about us

First Quarter 2000

C O N T E N T S

***On the cover*: Enjoying their first experience with a compound microscope, these aspiring scientists take a fascinating voyage into another world. The real future of any profession lies in the interests and dreams of young students.**
Photo© Richard T. Nowitz/Corbis

The CACNews

PUBLICATION STAFF

Editor-in-Chief: **Nancy McCombs**
(559) 278-2982
mccombsn@hdcdojnet.state.ca.us

Art Director: **John Houde / Calico Press,LLC**
(805) 642-1977
john@calicopress.com

Features: **Greg Matheson**
(213) 847-0043
GBM1@aol.com

Webmaster: **Mark Traughber**
(909) 782-4170
traughm@hdcdojnet.state.ca.us

Advertising: **Frank Healy**
healyf@hdcdojnet.state.ca.us
(559) 278-7732

Technical:

The CACNews, ISSN 1525-3090, is published quarterly (January, April, July, and October) by the California Association of Criminalists (CAC), Editorial Secretary, CaDOJ Fresno, 6014 N Cedar Ave., Fresno, CA 93710, (209) 278-2982, mccombsn@hdcdojnet.state.ca.us. The CAC is a private foundation dedicated to the furtherance of forensic science in both the public and private sectors. **Nonmember subscriptions** are available for $16 domestic, $20USD foreign—contact the Editorial Secretary for more information.Please direct editorial correspondence to the Editorial Secretary.

Notice to Contributors: We publish material of interest to our readers and are pleased to receive manuscripts from potential authors. Meetings and course announcements, employment opportunities, etc. are also solicited. Advertisements are also accepted, although a fee is charged for their inclusion in *The CACNews*. Please contact the Advertising Editor for further information. Because of the computerized typesetting employed in *The CACNews*, submissions should be made in the form of MS-DOS compatible files on 3.5 inch floppy disks or by e-mail (mccombsn@hdcdojnet.state.ca.us). Text files from word processors should be saved as ASCII files without formatting codes, e.g. bold, italic, etc. An accompanying hardcopy of the file should be submitted along with the disk. Graphics, sketches, photographs, etc. may also be placed into articles. Please contact the Editorial Secretary for details. The deadlines for submissions are: Dec. 1, March 1, June 1 and Sept. 1.

CACBits • Section News

Wine Country for Spring 2000

The California Association of Criminalists and the Forensic Science Society will hold our third joint meeting in beautiful Napa Valley, California in May 2000.

The wine country is an especially appropriate setting for this meeting celebrating the past, present and future of Forensic Science with its theme “Forensic Science Comes of Age.” The time seems ripe to examine our field. Our professional roots lie in the science of millenium’s end, our present in the application of technology to that science. We look forward to the seamless melding of science and technology with the legal arts. Share your interpretation of the past, your view of the present and your vision of the future of Forensic Science with us in Napa.

California is at its best in May and Napa Valley embodies all the very best of California. Nature, food, culture and agriculture in a rural environment close to fabulous San Francisco. We invite you to join us. CAC / FSS Joint Meeting, May 8 - 12, 2000. Hosted by Serological Research Institute.

Southern Section Highlights

One dinner meeting was held on September 15, 1999, hosted by the San Diego Police Department. The meeting held at the Raintree Restaurant featured Milt Silverman, Attorney, as the Dinner Speaker. His topic was the “Importance of Physical Evidence in High Profile Cases.” The following study groups met: Quality Assurance, Arson, Forensic Biology, Alcohol, Narcotics, and Trace Evidence. The attendance at the study groups was good. The number in attendance at the dinner meeting was 21.

The next dinner meeting will be hosted by the LAPD Lab in December. In March, the Kern County DA Lab will host a study group and luncheon / dinner meeting with a Lab tour of their new facility. In June the SDSO Lab has agreed to host a meeting.

The surveys asking about e-mail addresses, the KCDA Lab Tour, and the Crime Scene Study Group have been received from almost all Labs and many of the independent ciminalists. If you have not turned in a survey please do so. I will report the current results at the board meeting and the business meeting.

—Jim Stam

CAC Board Meeting in Reno

As the members of the BoD discussed at their last meeting, I have arranged for the CAC BoD meeting to be held in conjunction with the AAFS meeting in Reno, NV on Saturday, February 26, 1999 1300-2200. This is without charge to the CAC. The time was chosen to avoid Saturday morning papers, the day so as to avoid the many other activities at the AAFS meeting, including ASTM E-30, workshops, papers, etc.

—Hiram Evans

The Renewal of a Tradition

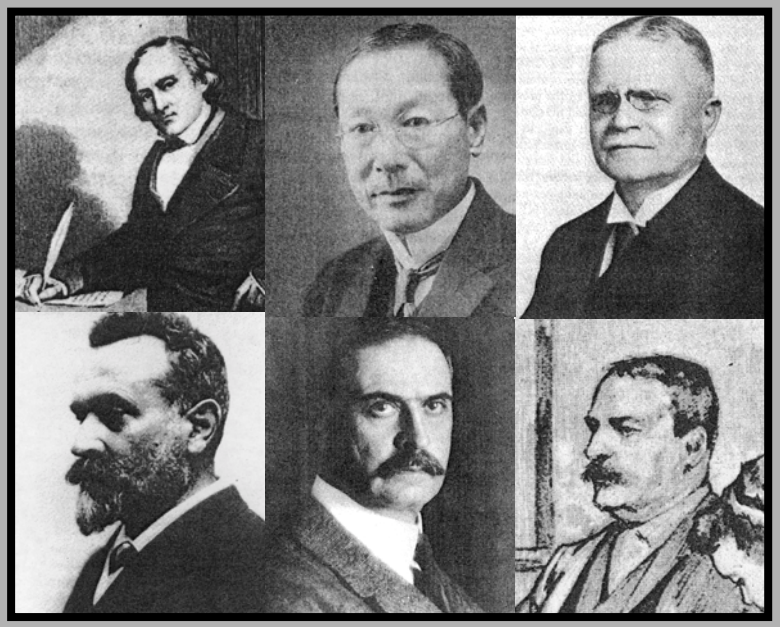
As an Association, the California Association of Criminalists is nearing its 50th Anniversary, over which time we have had occasion to develop some traditions and for a few to pass by the wayside. For some time I have seen pictures of those I have described as "very senior members" of the California Association of Criminalists, all past presidents, wearing a blue blazer with a patch in the form of the CAC logo. I am reliably informed by a senior (note I did not say "very senior") member of the Association that this tradition was started in 1970 by Ed Miller who arranged to have a tailor available at a seminar to have all who wished to be fitted for a blue blazer measured, the blazers to include a CAC logo patch. A few have managed to resurrect the patches from their horde of treasured accouterments, though the gold-lined blazers are long gone from use or displaced by what that senior member described as "their inability for modification to overcome the effects of increased prosperity".

In any event, I have offered past presidents a new CAC blazer patch, a small personal gift as belated thanks for their continuing contributions to the Association. We'll try for a group photograph of past presidents at CAC's Golden Anniversary...

—Hiram Evans

Ed Jones' Face Game

Turn-of-the Century



Match the portrait to the scientist who was working the last time the calendar “rolled over.” Masao Takayama, Alphonse Bertillon, Vincent Raspail, Paul Uhlenhuth, Prof. Wood, Karl Landsteiner.

Ans. in back.

Jobs • Meetings • Courses

DNA Program Needs PhD Holder

Kern County District Attorney's Forensic Science Division is seeking qualified applicants fot the position of DNA Criminalist.

Salary: $4291 - $5239, approximate monthly equivalent; Paid Biweekly.

Qualifications: A Ph.D. degree in biology, biochemistry, molecular biology or related area and successful completion of a minimum of 12 semester or equivalent credit hours of combined undergratuate and graduate course work in biochemistry, genetics, and molecular biology (molecular genetics, recombinant DNA technology), or other scientific subjects which provide a basic understanding of the foundation of forensic DNA analysis as well as statistics and / or population genetics as it applies to forensic DNA analysis and three years forensic DNA laboratory experience.

ESSENTIAL FUNCTIONS:

Direct the activities of the laboratory DNA program, including paternity and forensic DNA. Ensure proper and safe operation of the DNA laboratory. Interprets and demonstrates complex scientific principles and performs complex DNA analysis of biological samples submitted as evidence in criminal and paternity cases. Evaluates all methods used by the DNA laboratory and proposes new or modified anlaytical procedures to be used by examiners. Validates methods used by the laboratory. Solves technical problems of analytical methods. Oversees training, quality assurance, safety, and proficiency testing in the laboratory. Prepares reports on laboratory analysis, testifies in court as an expert witness. Trains other laboratory examiners in DNA analytical techniques.

OTHER FUNCTIONS:

Makes technical presentations to outside groups. Teaches classes or seminars in specialty. Performs other job-related duties as assigned. Incumbents must have the ability to perform the essential functions of the job.

To see a complete description of positon, send for a printed copy and application to:

Personnel Department: 1115 Truxtun Avenue, First Floor Bakersfield, CA 93301. Telephone: (661) 868-3480, 24 hour hotline: (661) 868-3481. Web page www.co.kern.us / person / jobs

Anticipated Openings

The Kern County District Attorney's Forensic Science Division is anticipating openings for the position of criminalist and forensic laboraotry technicians. These positions have not been officially been made available at this time.

If you believe you have the necessary qualifications for one of these positions, please send your resume or c.v. to:

Vernon L. Kyle, chief criminalist Kern County District Attorney Forensic Science Division 1300 18th Street, 4th Floor Bakersfield, CA 93301.

Gregory E. Laskowski, supervising criminalist Kern County District Attorney's Forensic Science Division glaskows@co.kern.ca.us.

CAC Sponsored CCI Course Announced

The Calif. Criminalistics Institute again offers the COURTROOM PRESENTATION OF EVIDENCE, course number A103, from March 8-10, 2000. This course was re-scheduled from Feb. 23-25, 2000. The location is the DOJ Advanced Training Center, 4949 Broadway, Comanche Room, Sacramento, CA. For more information, call Lou Maucieri at (916) 227-3575.

This course offering is supported by the California Association of Criminalists. A substantial portion of the enrollment will be selected by the CAC.

Stuff seen on the //WWWEB

65 DNA Positions in NY

The New York State Police is accepting applications for 65 newly created positions in its forensic laboratory biological sciences section. The positions were created as a result of a major expansion in the New York State DNA Databank Law. The individuals working in these positions will be located in the Forensic Investigation Center (FIC), in Albany. The FIC is a state-of-the-art laboratory. Details are available at NYSP website (Office of Employee Staffing) http://www.troopers.state.ny.us/ER/OES/OESINDEX.html (click on Position Postings).

NANCY**MCCOMBS**

You Never Know

Of the masses that have come and gone before our existence, and with only two millennia of urban life, it's awesome to think what a small percentage of us get to experience this mark in history.

Imagine explaining to those from the first millenium the concept of DNA, automated firearms, GCMS or accreditation. Criminalistics is such a novel profession and is developing so rapidly. A few years ago our science was virtually non-existent. Look at us now...*The New Detectives*, *FBI Files*, *The Bone Collector*, and as always, the evening news. Perchance someday everyone will know who we are. You never know.

It is intriguing to think of our profession in 3000 AD. What will it be like? Perhaps the legal limit for drinking and driving will be a 0.00%, we will have won the war on drugs, an instrument will count the number of striations on a bullet, arson cases will be the simplest to solve. You never know.

Maybe we will learn where God came from or the first living cell or...why we are here. Perhaps we will be able to communicate with the dead (there go our jobs). You never know.

We will have won the war on drugs, an instrument will count the number of striations on a bullet, arson cases will be the simplest to solve.

Of course it doesn't take an Ed Rhode's award recipient to predict that automation will continue to escalate in the future. Some fear it is slowly replacing us, and for many occupations this may be true. Yet a machine cannot piece together a crime. It lacks the curiosity and reasoning necessary to do so. The inquisitive human mind: capable of speculating, explaining and deducing. No, we can never be replaced by automation. This I know.

In this special millennium issue I am proud to introduce our new website (www.cacnews.org) and official webmaster, Mark Traughber. In the future, I have no doubt the website will replace the *CACNews*. Currently 75% of our membership have e-mail addresses, which will be published in our upcoming 2000 CAC Directory. This is a vast change from the 8% in the 1999 directory. Yes, my friends, we are now Y2K compliant.

As you read this issue, allow your mind to wander and explore the possibilities of what the future holds for our profession.

Nancy

F E E D B A C K

Criminalists Behaving Badly

I noticed your editorial in the last newsletter re civilized behavior at the meetings. ("A Code of Social Conduct," *CACNews* 3rd quarter, 1999) I think it's a good point. Reminds me of the meeting at which I became a CAC member. They publicly crucified, in the most humiliating way you can imagine, a young man for an ethics violation, as was the CAC's procedure at the time. He cried. I've never forgotten it. That was over 20 years ago. Civilization has been dead a long, long time.

— Joan Wraxell

www.cacnews.org Debuts

Some new things are happening with the CAC web page. I have taken over the role of webmaster for the *CACNews*. Currently we have hired a private company to put together a new Web Site. I will be responsible for relaying to them what we want. In the past, Peter Barnett has been kind enough to put together a site for the CAC. For those of us who used this site, we have him (and his helpers, if any) to thank. After brainstorming with Kevin Andera, we decided to keep what Peter has already given to us and add *most* or all of the following:

Current events page Includes projects currently funded by the CAC as well as others the CAC may be involved in. This page may stimulate new research ideas, help to keep us from reinventing the wheel, and generate overall interest. If you are working on an interesting project at work, please let me know! Requests for samples from other criminalists (for example, post coital ear swabs, etc.) may be made on this page.

Salary survey / Member directory Restricted to certain board members. If made available in the future to the membership, security from public access may be necessary.

Notification via e-mail Upon request, members will be notified when the site has been updated.

A Bulletin board is also planned.

CAC membership/ information How to join, availability of the CAC Constitution, Bylaws, Code of Ethics, CAC seminar guidelines, ABC info, and whatever else we feel would be useful here.

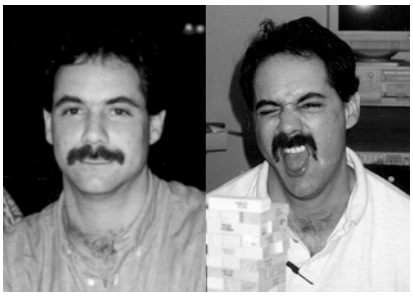
Fun stuff Current research indicates that you can be a professional and still have fun at the same time.

Timely updates I will constantly be monitoring the site (at least until my wife pulls the plug on the computer). If something has not been updated or does not appear to be working correctly, I will promptly contact the web people.

Links to other sites American Board of Criminalistics, Forensic Science Society etc. Links to vendors may assist in purchasing or obtaining information and could generate money for the site (which is currently paid for by the CAC editorial budget).

Study group page(s) Ability to relay topics or ideas to the Regional Directors North and South, committee chairs, and yours truly. If you're like me, you'll have an idea at 2AM. Now you can rush to the computer in your underwear and bunny slippers...no more waiting until morning, voice mail, busy signals, wrong numbers, new area codes, speaking to study group chairs who just had two cups of coffee, etc.

Here's my really simple philosophy on computers and the Internet: All this technology was invented to make life easier, not more confusing and aggravating. The least computer knowledgeable person (probably me) should be able to use the site with the greatest of ease. If I fail in this regard, I will bow my head in shame at all future CAC meetings.



(Left) The webmaster at 0.00%, (r) the webmaster at 0.10%

What about members without access to new technology, (computers, Internet, running water)? Someone will have to print the web site info on paper, fold it, lick an envelope and stamp it at the CAC's expense then deliver it to their cave via snail mail. Not a big deal when doing it for a few people, but the current mailing list is approximately 90 for just the south. Buy a computer. They're cheap. We're all technical people!

Will the new Web Site succeed? Who knows, but it's worth a try. If something proves to be useless, we'll throw it out and try something else. My feelings will not be hurt if you point out something that's amiss. However, if I really screw up I report directly to Editorial Secretary Nancy McCombs, whom you may blame as well. If you have any ideas for the site, please contact me. The goal is to put something together that helps the CAC use this incredibly powerful tool (computer + Internet). I appreciate this opportunity to give back to an organization that has assisted in training me. As new developments arise, upgrades and improvements will be made. Remember, this is *your* site. I hope you mark it as one of your favorites and use it often.

—Mark Traughber

Sneak Preview

[Re the Criminalistics 2000 theme of this issue.] Coincidentally enough, I am giving a talk at the Forensic Science Society meeting in early November with precisely that title. If the abstract seems appropriate I will try to prepare a brief discussion of the topic for the *CACNews*, but the primary paper is committed to the Forensic Science Society.

The abstract for that talk is "**The Role of Forensic Science Professional Organization in the New Millennium."**

Abstract: As we approach the millennium, and in anticipation of surviving the transition, it is appropriate to consider the role of professional organizations in forensic science. As a fairly young profession, with a relatively immature professional structure, US organizations such as the CAC, ABC, AAFS, the various SWGs, ASCLD, and ASCLD-LAB, and in the UK organizations and initiatives such as the FSS, NVQ, and professional registration proposals, are struggling with defining and implementing their own missions. Those organizations, for example CAC, AAFS, ABC, FSS, that have no allegiances except to the profession are particularly able to speak for the profession. Will these organizations assume, or assert, this role? Can, or should, these organizations depart from their traditional roles of fostering exchange of scientific information? Will these organizations influence the training of new or prospective forensic scientists? Will these organizations evaluate the performance of current forensic scientists? Will these organizations influence the delivery of forensic science services to the public? Will these organizations influence the working conditions of practitioners in the field?

—Peter Barnett

Criminalistics:

Two thousand

The future of any profession is guided by those who practice it. While some are content to do their job adequately, others seem possessed of a larger view. Through the dozen essays that follow, we get a sneak preview of that vision of tomorrow.

Venerate the Sithcundman

Stuart S. Kind

(Sithcundman - The oldest inhabitant; the one who knows what happened a long time since. From *"The Lost Beauties of the English Language," Charles Mackay, 1874).*

In summer, 1999, I went on holiday with my wife Evelyn to the south of England. We passed through the town of Portsmouth, home of the Royal Navy, and decided to go and see the recovered wreck of the *Mary Rose*. This is the English warship commissioned by Henry the Eighth (he of the many wives) in 1509. Our visit was mainly because of my conviction that scene of crime examiners have a lot to learn from archaeologists. I already knew the background of the story of the ship, which I had picked up over the past twenty years from British newspapers. It went something like this:

The *Mary Rose* was launched on a beautiful summer's day, watched by the king himself surrounded by his admirals and courtiers. Fully crewed and armed the ship sailed out proudly into the bay where it promptly sank.

I might describe this as another example of "Great British Failure" but for the fact that it occurred long before the British Act of Union. We can't blame this one on the Scots. But the exhibition itself was superb. Thousands of artefacts, many in a near perfect state of preservation, testified to what life was like on board a 16th century warship.

Normally I would have left such an exhibition just with a feeling of elation and satisfaction for something so well done. In this case I was also enraged. I was enraged because I had allowed myself to be suckered by the British press for twenty years. The story they had been peddling, with each journalist doubtless copying from the previous one, was wrong. The true story was:

In 1545, the Mary Rose*, fully crewed and armed, set sail to counter a French invasion fleet. She had been doing this sort of thing since she was launched in 1511, a long life for any warship. She fired off an opening broadside at the French and then manoeuvred to bring the guns on the other beam to bear. Then she sank.*

No one knows exactly why she sank (the French missed) but that is not the point of me recounting the tale. I tell it to show how even the old and the cunning can still be suckered. If that is so, what hope is there for the young? Erroneous tales such as these abound and all those employed in the judicial process, including all forensic scientists, should listen, and read, and then bring a sophisticated and sceptical mind to bear on what they have just been told by someone else.

Now two more examples. I spend a lot of time in my retirement on e-mail debating forensic science with many colleagues, working and retired, all over the world. Recently I got involved in a debate on a forensic "list" in which Canute (he of the very wet feet) was involved. You remember? He was the king of (part of) England who remains famous for his failure to stop the tide coming in. What a jerk the man must have been. But wait; the true story is as follows:

Canute was getting fed up with his fawning acolytes telling him what a superb, all powerful, guy he was, so he decided on a little demonstration on how his powers were limited. He ordered his courtiers to set up his throne on the east coast of England, near to the water's edge, just as the tide was turning. He went and sat in it and ordered the tide not to dampen

the royal feet. The tide ignored him so he got thoroughly wet and he turned to his courtiers with the royal command: "givest thou this royal personage no more adulatory crap."

The fact that I cannot guarantee the exact form of Canute's words should not be allowed to detract from the point that few give Canute the credit for what he actually said and did.

But the true version is easily accessible in original sources but no one goes back to those.

One of my sons, a lawyer, sometimes gives me legal equivalents where a precedent is not based upon what the judgement was but upon what some legal commentator said that it was.

Now for an authentic forensic example. On this same e-mail debating list I noticed a request from a librarian at an American university for information regarding a sinister forensic scientist in England who had reputedly spent his career lying to the courts, until he was removed from his job by his employers. The librarian's query was answered by a young British forensic scientist who emerged from his specialist cubicle to give the forensic establishment account of the matter. Where did he get his information from? It certainly wasn't from direct knowledge because he was still at his mother's knee when it all happened. Yet he emerged from his slot and magisterially pronounced on the matter, believing no doubt that he was qualified to do so.

So the lesson here is that it's not only journalists who uncritically parrot what other people have told them. Some forensic scientists do. They believe that because they are forensic scientists they are qualified to comment upon all that is forensically scientific. Yes, you've probably guessed, I was involved in the matter myself, so read what I say with circumspection.

So the lesson here is that it's not only journalists who uncritically parrot what other people have told them. Some forensic scientists do.

There is a collateral and insidious process too, in this corruption of the facts. All successful organisations grow in size and with that growth comes an increasing division between the professional and the administrative. The days when the enthusiastic forensic scientist left the laboratory at the end of a hard day's work and then spent the evening as a volunteer administrator for his professional society are gone. This is regrettable but necessary. The volunteer officer cannot deal with a large and increasing number of administrative tasks and still leave sufficient energy to do his professional job properly. And so the administrative tasks burgeon as does the number of specialist administrators. Here lies the danger.

The forensic scientist knows many things that are professionally important because of his professional job and his professional experience. The administrator does not, and so may tend to view every "historical" aspect of the job as an unnecessary impediment. The decks must be cleared for action and all *incunabula* discarded or, "sent away for safe keeping" which is the administrative equivalent. Thus are the words of the sithcundman forever silenced, change becomes equivalent to progress, and limitless prospects for reinventing the wheel are opened. He who knows no history will be condemned to relive it.

There can be no definitive last word on any complex human affair, but wouldn't it be useful for the training of the young to carry at least an element of listening to, or reading the writings of, the sithcundmen? For the millennium I recommend that all forensic science societies call upon their older members to sit in state, like King Canute. There the sithcundmen will discourse upon the realities of the forensic human condition to the younger members who are respectfully gathered at their feet. It is then that the young will learn how the trouble starts when there is no one left on the board who remembers the last time it happened.

Yet even here there must be the realisation that high authority itself may be wrong, and that what even the sithcundmen say must be received courteously but critically. Theirs may be the last words but they can never be the final ones, no matter how eminent the speakers.

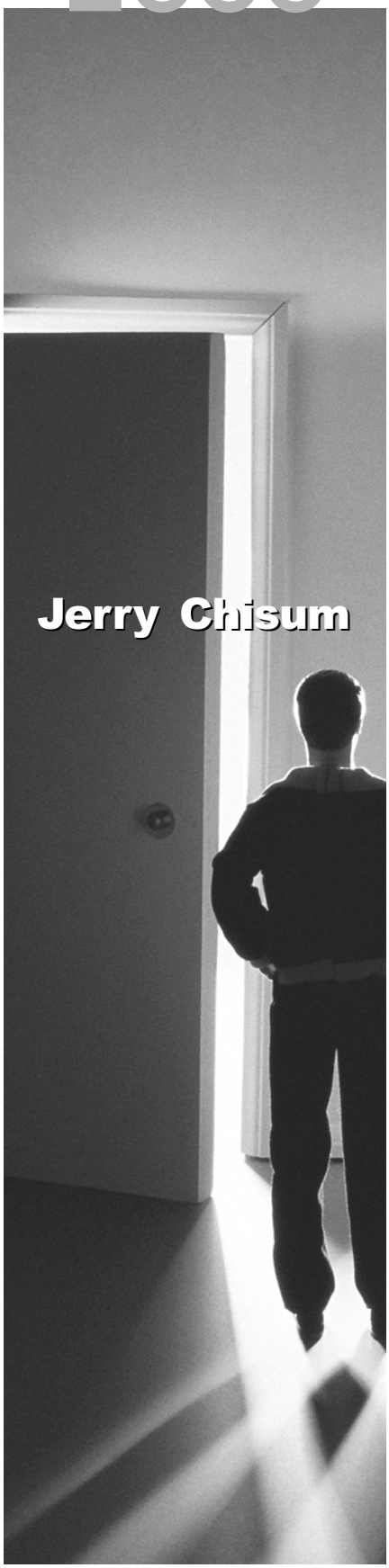
For myself I always keep in mind the chilling example of the Union general who, peering over a wall at the Confederate lines some distance away, said:

"Danger? Hogwash! Those guys couldn't hit a barn d—!"

And he was highly qualified to judge.

FOOTNOTES

If you want to help find out why the *Mary Rose* sank visit www.compulink.co.uk/~mary-rose



Criminalistics in the 2000's

Jerry Chisum

Where will we go in the next several years as we pass into the next millennium? By we, I mean those of us in the profession of criminalistics, that branch of forensic science devoted to the study and interpretation of physical evidence.

I was asked to write my thoughts about what I see in the future of criminalistics. I would like to just speculate and predict that all problems will be solved. However, that would be sheer fantasy. It has been said the best measure of the future is the past. Therefore, let me describe what I see has happened in the past 40 years that I've been in the field, then, based on what trends I see, I will give my view of the future of this profession.

Professor Paul Kirk was the "father of criminalistics" in California. Graduates of the program at U.C. Berkeley became directors of most of the laboratories. No discussion of Crime Labs in California can ignore the Kirk influence. He gave direction to us through his teaching. In the introduction to his book, Crime Investigation, he stated that "the study of physical evidence has a twofold purpose. ***First***, and most important, it is often the decisive factor in determining guilt or innocence. ***Second***, the study of physical evidence can be a material aid in locating the perpetrator of a crime." Both of those purposes were incorporated into the laboratory workings.

When I started in the field, the criminalist, at least in California, was capable of doing everything in the laboratory. One day, you would run blood alcohols, the next test for the barbiturate levels in the blood, then examine a tool mark, run a density gradient on some glass, type some blood, or examine underwear for semen. You might test fire some guns, compare the bullets or cartridge casings, vacuum some clothing and compare the fibers found to those from the victim's clothing or analyze vacuum sweepings for fragments of marijuana. You would go to court and testify about the results of the tests you've made. And, go to the crime scene of a burglary or occasionally; a homicide to collect the evidence. Some criminalists even examined the handwriting on bad checks.

To many, the criminalist was thought of as a kind of super scientist; however, the science was not the chemistry, physics, biology, etc. but the science of identification and individuality (Kirk). We called it the science of criminalistics. We were scientific investigators, we applied our science to the investigation of various crimes and we helped investigate those crimes. One person could operate a forensic laboratory successfully.

The criminalists were not only involved in the laboratory work, but were part of the investigative team when a big case came about. We were consulted regarding the investigation, we went to the scenes, we met with the Task Force or other management group of the investigation.

I remember Bill Penprase (toxicologist with LAPD) returning from an Academy meeting in the early 60's. He said that the toxicologists were mad at the California toxicologists for first quantifying the level of barbiturate in the blood, but then using paper chromatography to specify which one it was. Back East they had been happy giving the medical examiner the fact that barbs had been found in the blood. They were joking with Bill, but the identification of smaller and smaller amounts of materials has been one of the two-edged swords that we made for ourselves. The better we are, the more that is expected.

The number of criminalists has increased over the years, but not significantly in comparison to the number of crimes and the number of officers using the services.

Criminalists have been forced to stop working crimes against property, concentrating almost solely on crimes of violence. The amount of data produced about a stain or a fiber is several times what it was, but this has resulted in sacrifices in the number of stains or fibers that can be examined.

In the 70's there was tremendous growth in the number and size of crime labs. This was based on the President's Report on the Criminal Justice System. (Ordered by John F. Kennedy) this growth stopped when the Federal monies dried up for this field. The resultant growth caused several places to hire persons to run their laboratories that were not criminalists nor even familiar with forensic science. Some of these labs were seen as problems in the field. The American Society of Crime Laboratory Directors (ASCLD) started as a way to communicate and assist these labs, ASCLD Laboratory Accreditation Board (LAB) was an adjunct to the Society that was to help correct the deficiencies in these labs. The concern about quality became the cry of the 90's. Perhaps to the point that service has been lost for the sake of quality.

Paul Kirk was always looking for a way to individualize. He wanted to do so through the blood. He predicted we would have an easier time in the laboratory if we could just say exactly whose blood it was at a scene. That is now possible. However, that ability has brought a whole new series of problems that do not make it easier in the laboratory. A DNA analyst must specialize in the analysis of DNA. The field is too complex to expect the analyst to also do firearms or fibers or toxicology. This trend extends into each of the fields that comprise the sections of the crime laboratory.

The advent of computers has made tremendous impact on the field. The instrumentation is almost all based on computers. The data that allows for comparison is far beyond the wildest dream of the criminalist of 30-40 years ago. This trend will continue as computer power increases and the amount of information available continues to rise. The automation of bullet comparisons and fiber searches should result in more time for the analyst, however this is not the case. The more that can be done, the more that is expected.

[T]he identification of smaller and smaller amounts of materials has been one of the two-edged swords that we made for ourselves.

The Future

Next year the voters of California decide the fate of crime Labs with Proposition 15. $220 million for building and stocking crime labs in California. How will that be spent? The money requires that the laboratory be accredited, so some of the mistakes of the 70's will be avoided. A lot of the money will, undoubtedly, be used to upgrade the equipment in the labs. This will require hiring new personnel or extensive training. The California Criminalistics Institute will have to increase the staff to accommodate this increase, it will also require increasing the size of that facility. The number of training courses offered by the CAC will need to increase.

Management of the crime labs have gone from a *laissez-faire* supervision of the staff to an imposed micro-management style. This is in part due to accreditation, requiring testing and controls that have become increasingly restrictive. The managers that were Kirk influenced are retiring or have retired. The burden of the changing crime lab has been left to the 2nd generation, however, they too are getting older. Soon a new manager will appear, hopefully these managers will obtain management skills through the MPA program and a new era of laboratory management and supervision will result. Management skills will become increasingly important as the monies financing the laboratory become more controlled through the legislature. Proposition 15 will benefit those laboratories with skillful managers, it will harm those will poor management skills. These managers will have to be more aware of the expenditures than ever before, the money of Prop. 15 will come with a price tag, accountability. The laboratory must prove it is worth the money spent on it (Kirk).

New developments in electronics will continue to benefit the laboratory. The new chip-based DNA analysis may result in great time savings, but the explanation of the technology will require more specialized knowledge on the part of the analyst. Developments in other sections will also increase the knowledge levels required. Instrumental analysis in chemistry, for example, will require specialists on various types of instruments. Even now, the SEM / XRF is underused as the persons running the instruments are cognizant of all its potential uses in the examination of trace evidence.

Driving under the influence cases, once one of the most time consuming jobs of the laboratory, have dropped in analysis time and court time. With new technology, this time consumption may fade to almost nil. Drug analysis will continue to require more and more sophisticated analyses as new drugs come on to the market. Technol-

ogy will keep up, requiring more specialization on the part of the analyst.

Court time on routine types of examinations in D.U.I and controlled substance cases have dropped considerably due to legislation. However, the infamous O. J. Simpson trial and the new standards of *Daubert* have caused court to become even more dreaded for the expert witness. These court imposed standards enforce the knowledge requirement of the witness; another factor leading to specialization.

What does all this mean? I see a very sophisticated crime lab in the future, able to do many types of examinations, having super experts and several technicians. However, the ability to communicate with the police has been lost. The evidence submitted is that chosen by someone not directly involved in the laboratory analysis. The analysis performed is limited to that requested. The putting together of several types of evidence is left to the police officer or the district attorney.

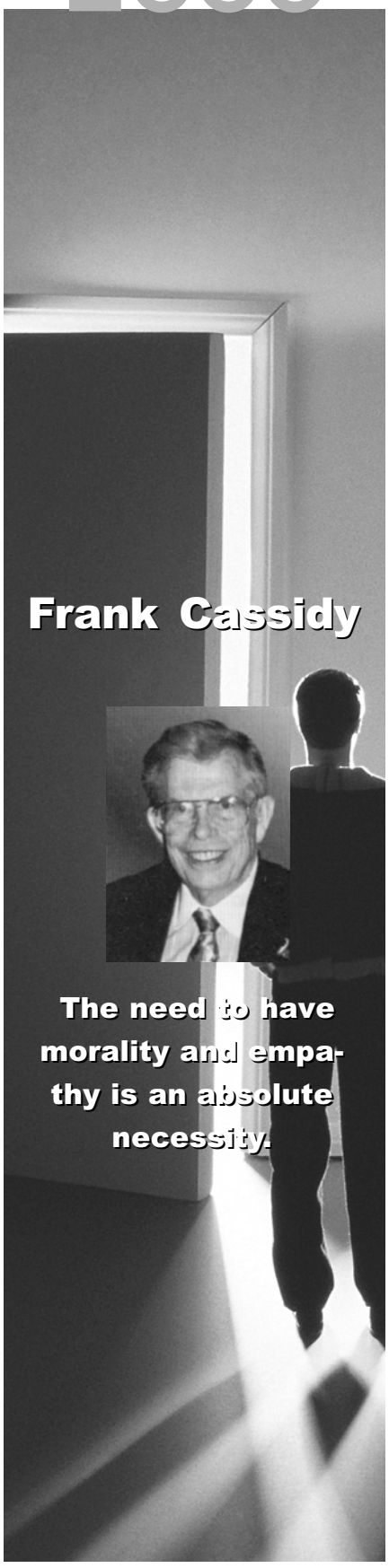
Paul Kirk stressed training persons who collect the evidence. “Perhaps the most important function of the police laboratory is to train the police investigators as to what constitutes physical evidence, how it is to be found, collected, preserved, and delivered to the proper laboratory investigator.” Unfortunately, this function of the laboratory is not a high priority. The persons with the field experience to tell the officers anything but “what the lab can do with the evidence” is frighteningly small at the present and will become even less in the future.

Many departments have Crime Scene Investigators (CSI) who do the field work. The role of these positions will increase. The forensic scientist will cease to respond to crime scenes. The CSI will be the liaison between the laboratory and the police. The management of the laboratory of the future will need to recognize the lack of ability to communicate with the client. A liaison position in the crime lab will need to be developed. Paul Kirk told me in 1959 that the F.B.I. lab had one serious drawback, it was composed of specialists, no one was there to evaluate the evidence and direct how it was to be examined. He said he thought an ideal lab would be one in which there were super specialists in the various fields AND a super specialist in the interpretation of the evidence referenced to the crime, in other words, a Criminalist.

Whether or not I like the view of the future I must take responsibility. I helped set the trends that have resulted in this direction. I believe in this field and feel the future will result in better, more efficient laboratories commanding a greater place in the Criminal Justice System.

My View of Criminalistics of the Future

Frank Cassidy



The need to have morality and empathy is an absolute necessity.

I was very pleased to receive an invitation from the *CACNews* asking me to submit my thoughts about how I see the future of our criminalistics profession. I accept the invitation and have submitted this short essay.

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

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

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

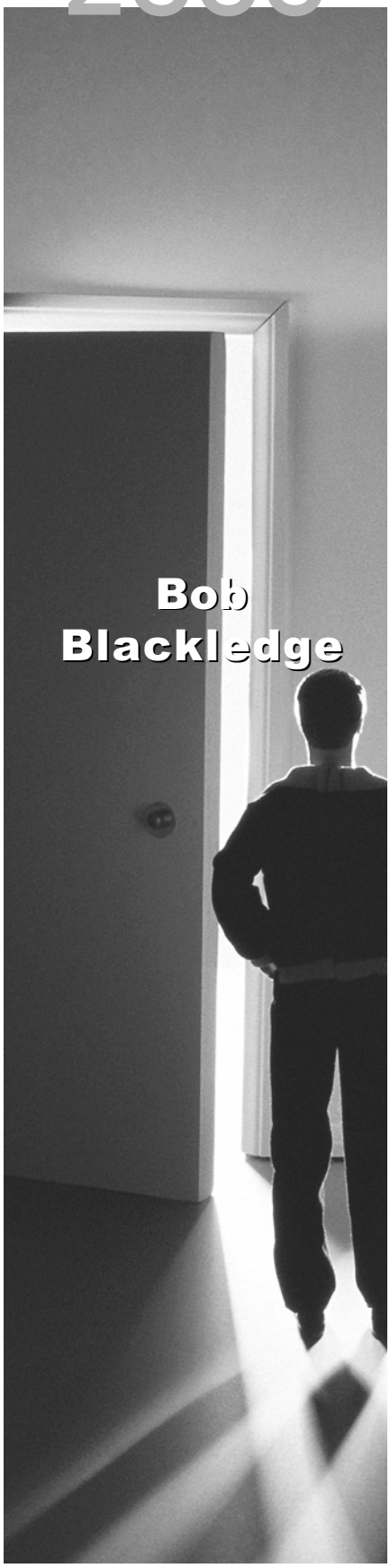
3. This new problem—especially in those laboratories that have generalist criminalists—is that there will be a great necessity to increase the number of criminalists in the laboratory. This will become a problem from the financial aspect. But if it is necessary to have satisfactory analysis of physical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

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

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

6. With the greater emphasis on science, one must not lose the moral basis behind justice. I think that everyone should review the short article, "Not Just a Box of Swabs," by Jill Spriggs (*CACNews*, 3rd Quarter 1999, pg 7). A criminalist must not forget that it is human beings—suspect(s) and victim(s)—that our work is involved with. Thus, the need to have morality and empathy is an absolute necessity.

These are the thoughts of a retired criminalist—physically, but hopefully not mentally. Criminalistics has been a very satisfying field of endeavor for me and I think that I have done some positive things that have minutely advanced the field. And I am eager to see what the future holds for this great profession.



On a Clear Day

Bob Blackledge

When the *CACNews* asked me to submit my thoughts on "*Criminalistics in the New Millennium*," my initial reaction was, "that's the last thing I would want to do!" I've assiduously avoided the internet bulletin board, "forens-L." The self-promoting individuals in that and like media who take themselves oh so very seriously, and are always pontificating their vast forensic science knowledge to the great unwashed are anathema to me.

However, once John put the idea in my head, I found I couldn't help thinking, "What might Criminalistics be like in the future?" So I decided to give it a shot. However, please realize that I don't take myself all that seriously. I'm doing this just for fun, and much of what I say is with tongue in cheek.

Past is prologue. Predicting what criminalistics will be like in the near future is not all that different from predicting the future performance of a stock. That is, you look at its past performance and recent trends. So first, let's briefly look at present trends in forensic science.

Now is the winter of my discontent. I've been in the CAC since '89 and in forensic science since '71. People in forensic science, and especially those I've become acquainted with in the CAC are the most interesting and most vital people I know. [By contrast, I once spent a day touring a large U.S. Food and Drug Laboratory and it was like spending a day in the morgue!]

If you're like me, then perhaps you were attracted to criminalistics because you like to solve puzzles and you also have a strong sense of justice. I doubt that you entered the field because you figured you'd be able to make good use of your accounting and record keeping skills! And yet, even prior to **O.J.** more and more of our time was devoted to the mundane and picayune.

I polished that door so carefully — Now is the Golden Age for those in criminalistics who love to be able to sit in judgment over others, or for those lardaceous derrieres who feel like they've had a really productive day if their committee finally managed to hammer out the proper wording in a paragraph in their proposed twigmat (swigmat?) guidelines.

As members of ASCLD inspection teams, self-important little satraps are able to wield their despotic powers over both the great (FBI Lab) and the small (NCISRFL-San Diego). When my lab was inspected I had a questioned document examiner telling me how I should be working arson cases!

Yup, if you've got a briefcase and are from out of town you're an expert!

In many labs individuals who have been given titles such as "Supply Officer", "Safety Officer," and "QA / QC Officer" are making life hell for those merely trying to do criminalistics. In one lab the QA / QC Officer even tried to make the criminalists generate a "Supplemental Report" every time an attorney called and discussed anything about a case!

Sometime just after Washington crossed the Delaware, I was an officer on active duty in the U.S. Army. Although I didn't fully appreciate it at the time, the Army had a wonderful policy regarding the area of "additional duties."

The most onerous assignments such as "unit morale officer", "health and welfare officer", "United Fund or U.S. Savings Bond Officer", and "Unit Fund Officer" were given as *additional duties* to the lowest ranking junior officers.

Because they were just that, *additional duties*, one could not afford to focus on them to the exclusion of all others if they wanted to end up with a good officer evaluation. In order that individuals assigned duties such as Safety Officer, QA / QC

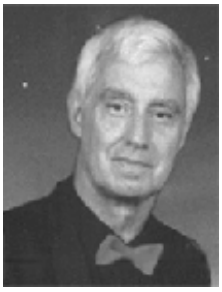
Officer, etc., keep the true mission of the crime laboratory in proper perspective, these should be assigned as *additional duties.*

Sitting by the dock of the bay, wasting time. Proficiency Testing. As John Houde would say, "Don't get me started — too late!" Many years ago when proficiency testing first began and the results were anonymous, it was a wonderful teaching tool. I especially liked looking at the methods and instrumentation used by other labs and how they worded their findings. I found out things that were only apparent when you looked at a large enough database. [For example, in paint comparisons don't place much reliance on small variations in elemental analysis at the trace level.] However, there have always been problems.

"If trainers have trainees, does it naturally follow that testers have testes?" - with CTS, not necessarily. I could go on an on, but my frustration with Collaborative Testing Services, Inc. and their Forensic Testing Program can be summarized by relating a recent incident. A colleague had weeks earlier completed a paint proficiency test involving the comparison of three samples. It was absurdly easy. One of the samples clearly was different just by looking at them without magnification. Then on a Friday morning the one page "*Manufacturer's Information* Test No. 99-***; Paint Analysis" was faxed to the lab. The lab director looked at it and then showed it to the examiner. According to the *"Manufacturer's Information"*, one of the samples was different and the other two matched, but not the two reported by my colleague. Frantically she searched through her notes. She is very well organized and meticulous in her work; how could she possibly have gotten the samples mixed up? She was so upset that she went home early that afternoon with a splitting migraine headache. She hadn't been gone for more than fifteen minutes when another fax arrived from CTS. I quote it verbatim:

*"CTS has become aware of an error concerning Item Numbers on the Manufacturer's Information for Paint Analysis Test No. 99-***. The correct information is as follows: Items 2 and 3 were from the same paint panel, while Item 1 was taken from a panel with a different formulation. An updated copy of the Manufacturer's Information follows. CTS would like to apologize for any inconvenience associated with this error."*

So on the one hand you have a situation where due to the current philosophy regarding a failure on a proficiency test the career of a criminalist might be virtually over, and yet the real culprit basically says "whoops, sorry about that" and incurs no penalty!



I really believe that once the swigmat committees have all worked out their guidelines . . . criminalistics will still be fun!

Resistance is futile. You will be assimilated. Just a few weeks ago I was put on notice that I might have to testify in a routine case involving sale and possession of methamphetamine and MDMA ("Ecstasy"). We were required to send by fax copies of all my notes, my CV, maintenance records for all the instrumentation that was used, the lab's SOP, proficiency testing results, and the NCIS headquarters in Washington even had to fax copies from pertinent NCIS manuals. And so after all this what happened? Yup, my testimony was not needed. The defense stipulated to my report.

So is this what criminalistics will be like in the future? Is the future all that bleak? I don't think so; I actually view the future with cautious optimism.

I can see clearly now, the rain is gone. In the future, all forensic labs will have sites on the Internet. In the movie, *The Graduate*, at the garden party reception in his honor a business associate of his father steps up to him and whispers in his ear "plastics." Well, I would say "forensic science webmaster" (and then I would offer Mrs. Robinson a ride home). Anyone who cares to will be able to log on. You want a criminalist's curriculum vitae? - it will be there. The lab's SOP? - it's there. Maintenance logs, proficiency test records, - all there. Because of privacy concerns you will not find specific case information. However, all of the case information will be in the lab's computer system and can be sent (encrypted) with a click on the "send" icon. Yes, anyone can access this information. But if they want hard copies, the time to download and print, and all the toner cartridges and reams of paper will be at their expense!

Oh, but the Honorable Phineas T. Bluster will only accept original *signed* documents? No problema. Court rulings will have opined that *electronic signatures* are trustworthy and not capable of alteration. [A few weeks ago some image files showing evidence that I had examined were inexplicably deleted from the image analysis system's hard drive (yes, I know, backup, backup, backup). Fortunately, I had hard copies.] With *electronic signatures* this shouldn't happen. No one will be able to enter your case files, and even if you were to enter them a trail showing when and what additions / deletions / alterations you may have made would be generated.

One of William Shakespeare's sonnets goes: "Nuns fret not in their cloistered cells, nor students in their pensive citadels - " (I hope I got it right, I'm more familiar with the one imploring virgins to make the most of time!). Actually, the idea that he was putting forth was that the poetic form, the sonnet, has a very definite, narrowly defined structure. But rather than finding it confining, he (as with nuns and students) finds comfort in its structure and order. I found the same thing when I was in the Army. I didn't have to waste my time deciding when to get up, what to wear, what to have for breakfast, and when to report for work!

I really believe that once the swigmat committees have all worked out their guidelines, and each lab not only has an SOP for the different types of examinations but the individual criminalists actually follow them, that criminalistics will still be fun! Just as Shakespeare in the confines of the sonnet still had lots of room for originality, we will also.

But what impact will technology have on criminalistics? There too, I'm optimistic. I believe that new technology will actually give us more time to do the things in forensic science that we really love and find most challenging. Let's take DNA as an example. Certainly in its earliest days of RFLPs and Hardy-Har-Har equilibria, it would be hard to imagine anything more tedious. But although it has yet to filter down to many forensic labs, a cursory look at relatively recent publications paints a different picture.

In "Analysis of Short Tandem Repeat Polymorphisms in Human DNA by Matrix-Assisted Laser Desorption / Ionization Mass Spectrometry" [*Anal. Chem.*, Oct. 1, 1997, pp. 3966-3972], Ross and Belgrader of AFIP report: "The entire sample preparation for MALDI-TOFMS analysis immediately following PCR amplification from human DNA extracts can be accomplished routinely in under 12 min. in a single Eppendorf tube. The simplicity of this approach essentially eliminates the sample preparation bottleneck encountered with MALDI-TOFMS analysis using existing methods."

John Butler of GeneTrace Systems, Alameda, CA, published "STR Analysis by Time-of Flight Mass Spectrometry" in *Profiles in DNA* (Promega Corp. newsletter), Jan. '99, pp. 3-6. Butler says, "Our sample purification procedure, which has been entirely automated on a 96-tip robotic workstation, reduces the PCR buffer salts and yields `clean' DNA for the mass spectrometer. Using our robotic workstation in combination with a single high-throughput mass spectrometer, we have been able to purify and analyze over 2000 samples in a single day."

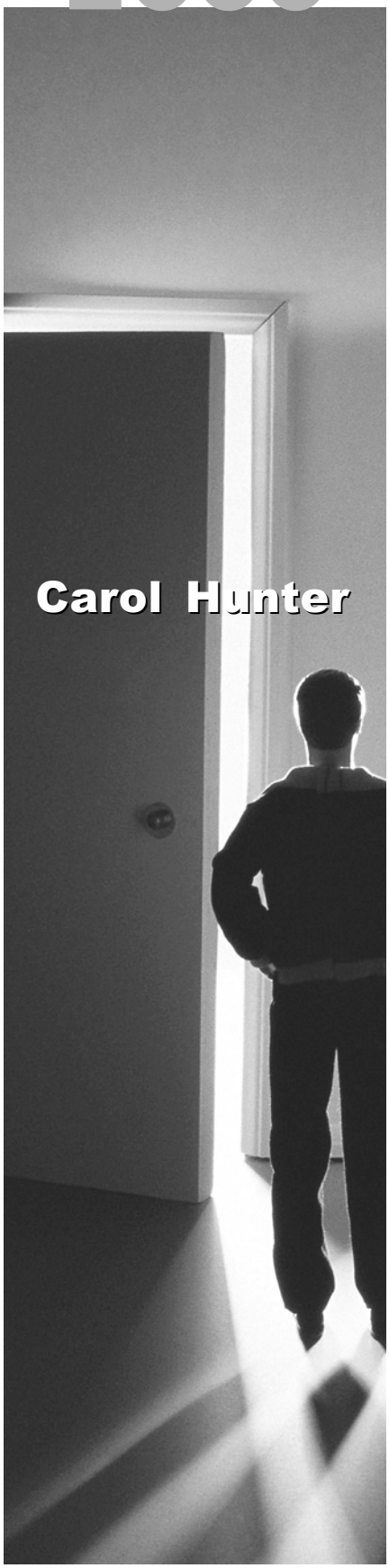
And lastly, Taranenko, *et al*, at Oak Ridge National Laboratory published "Gender Identification by Matrix-Assisted Laser Desorption / Ionization Time-of-Flight Mass Spectrometry [*Anal. Chem.*, Sep. 15, 1999, pp. 3974-3976], and report: "With this approach, the time of sample analysis (excluding sample preparation and the single PCR reaction) is less than 1 sec as compared to hours for conventional agarose or polyacrylamide gel electrophoresis. In addition, unlike capillary or polyacrylamide gel electrophoresis, no fluorescent dye or radioactivity is required. Furthermore, the sensitivity of MALDI-TOF-MS was at least 1 order of magnitude greater than what has been previously reported for fluorescent based analyses."

So if the above articles are at all indicative, in the future we will be spending less time on the actual analyses. However, just before I sat down to write this I was looking over my mail and an item caught my eye from the first page of *Sample Preparation*, Vol. 4, N0. 10, Oct. 1999 (from the *Editors of R&D Magazine*). "SFE recovery: A situation where size does matter" by L.J Mulcahey and L.T. Taylor begins: "Today's analytical lab chemists spend most of their time preparing samples rather than actually analyzing them. This preparation time is the major source of error and the major consumer of labor in the laboratory." Well you can substitute "*criminalists*" for "analytical lab chemists" and it is equally true.

And as far as the term "preparing samples" is concerned, in forensic science it really begins with the crime scene. I received my initial forensic science training when I was employed by the Florida Department of Law Enforcement to work as a criminalist in their crime lab in Tallahassee. In their system you tend to specialize in one discipline from the very beginning, and I was put in their Chemistry Section doing arson and drug cases. When I moved to California and started attending CAC Seminars, I was soon in awe at the obvious ability of many members to go to a major crime scene and see *both* the forest *and* the trees. They could clearly see the overall scene, and come up with a processing plan that took into account the overall case needs and all the different categories of evidence and types of examinations rather

than just viewing it in terms of some narrow field of specialization.

No doubt technology will continue to develop tools that will assist us at the crime scene and in the laboratory (almost every issue of *Chemical & Engineering News* mentions further progress in miniaturization leading to a "lab on a chip", and recently two separate groups have reported in the *Journal of Forensic Sciences* that it is possible to extract DNA from dandruff). However, I don't see science ever replacing the trained, experienced, and detached criminalist. And whether or not it is the same individual at the laboratory as at the crime scene, there will always need to be a "senior criminalist" to "orchestrate" the types and sequence of laboratory examinations in terms of the case needs. One entering the forensic science field will likely have to spend more time than previously as an entry-level criminalist and then as a journeyman before attaining the level of "senior criminalist", but this will be an exciting path and a goal worth striving towards.



Criminalistics in the New Millenium

What will this new Millennium bring to our profession? Where is criminalistics headed?

I think that we will wake up January 1, 2000, it's a Saturday by the way, and nothing will look immediately different. I think that if we are not careful, we will be lulled to continue on our current pathway. What is that pathway? Here is my own perspective. Why are you hearing from me, and who am I to give a perspective on the future of criminalistics? Here is my story. It is a window in the history of criminalistics in this country. Look through this window to the past briefly before we look into the looking glass of the future.

Criminalistics in the 70's: I'm originally from a government laboratory which was initially funded with LEAA money. I was a lucky recipient of LEAA free training in the 70's in the areas of forensic serology and microscopy courses at McCrone Research. There were still free classes at the FBI in Quantico. In other words, the government was committed to bringing the United States into the world playing field in criminalistics. Talk to your colleagues in my age group (we're in our late 40's, early 50's), and you will hear more of this story.

It was an era of newly trained microscopists. This meant that it was a significant era for trace evidence. Think of a few of the famous cases in forensic science…The Hillside Strangler, the Freeway killer, Wayne Williams, and trace evidence comes to mind. Hairs, fibers; transfers, primary and secondary.

It was a giant era of newly-trained forensic serologists. The introduction of a multisystem designed to give genetic results from eight different genetic markers from minimal sample within one long day's work. We were finally characterizing blood and semen beyond just ABO and Rh systems. Getting these test results into the court systems did not come without battle scars. These battles, learning how to express the scientific foundation for protein genetic markers from dried bloodstains, offered the foundational ground work for the court battles for DNA in the 80's.

Ah, the 80's. The continuation of the genetic systems and trace evidence analysis of the 70's. But also, the advent of DNA technology, laboratory accreditation, certification, specialization. Criminalistics grew up from the 70's teenager to an 80's young adult. Major growth pains. But a positive progressive development, and self-guided as well. This led criminalistics sturdily into the 90's. But in the 90's, we develop other growth pains.

Laboratories have grown, doubled and tripled in size. Those criminalists that profited from all of the LEAA training in the 70's now found themselves in middle and upper management. When did the management training come into play??? Several university forensic science programs folded. Funding for training waned, Who is training our future criminalists? As laboratories grow, new facilities are needed, personnel expenses expand, and capital costs explode. Priorities in the financial arena seem to be upside-down.

Technology, especially in the molecular biology circles, expands exponentially. The hands on DNA of yesterday will soon be robotics of tomorrow. DNA uniquely characterizes a biological material. Gee, why bother with the fibers, shoeprints, physical matches and all of that extraneous stuff? National DNA advisory boards and technical working groups (made up of our peers) tell us that we must have Ph.D. molecular biologists heading our DNA laboratories. Specialization has arrived in DNA and a model laboratory staff structure is defined, which included stringent educational requirements beyond the levels currently expected for analysts already employed.

Technical working groups become scientific working groups in each of the

areas within criminalistics - trace evidence, drugs, etc. Eventually the trace group subdivides (did they get too close to an endonuclease in the DNA lab group??). Taking the lead of the specialization within the sibling DNA group, the trace materials group defines a model laboratory staff structure and educational requirements which threatens to eliminate existing criminalists.

Have I set a picture? Do you begin to see the trend? So where are we headed in this new millennium? Sadly, I do not feel that we can restrain the pace of this "bullet train" ride toward specialization of analysts in criminalistics. This evolutionary change however could be an inherent error and the cause of the elimination of our species, as we once knew it.

We are surrounded by an infinite world of materials; any or all of which could end up as part of evidence on our lab bench. In order for us to recognize evidence, the analyst must have the knowledge, skills and abilities to identify and isolate these unknown material(s) as significant. This requires that the analyst acquire and maintain GENERAL KNOWLEDGE, SKILLS, and ABILITIES of all evidence categories.

Those criminalists who profited from all of the LEAA training in the 70's now found themselves in middle and upper management. When did the management training come into play???

Therefore, I recommend for the new millennium, that we define a NEW specialty…The GENERALIST. A criminalist that can look at the evidence as a whole and see a full picture. We need to develop and maintain the criminalist that can pick up those various pieces of the puzzle, parts of the whole spliced together by the specialist, and fit them together and create a the whole image.

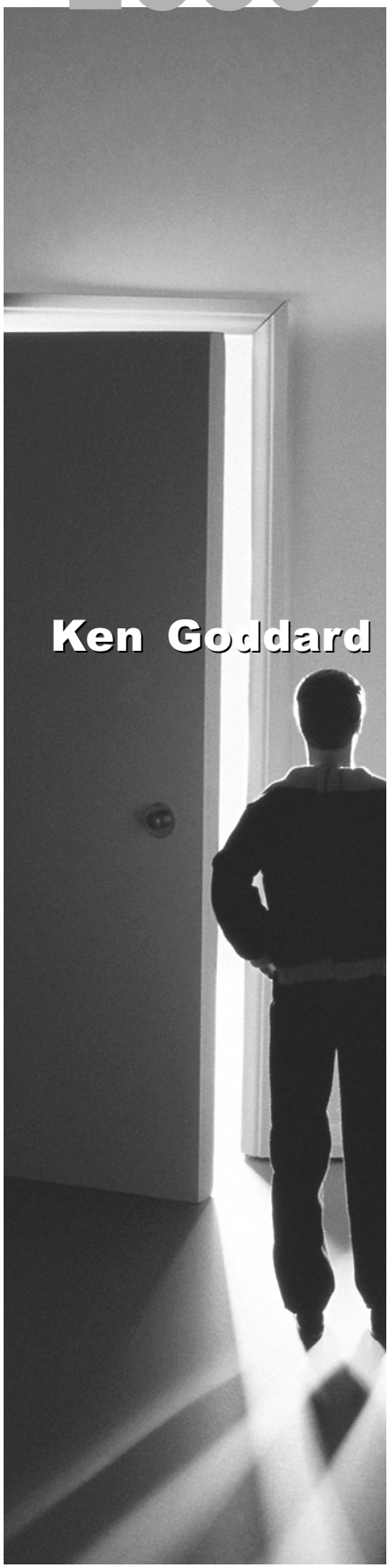
Quoting Osterburg (1949)[1]" …the laboratory investigator must visit the scene of a crime for the purpose of a general examination of the physical surroundings to discover such traces as fingerprints, footprints, bloodstains, hair, fibers, matches, bullets, shells, dust, and other indications which may point to the perpetrator."

Kirk spoke to physical evidence as a whole quite eloquently (1952)[2]" …evidence does not forget. It is not confused by the excitement of the moment. It is not absent because human witnesses are. It is factual evidence. Physical evidence cannot be wrong; it cannot perjure itself; it cannot be wholly absent. Only its interpretation can err. Only human failure to find it, study and understand it, can diminish its value."

If we allow our profession to continue down the pathway toward specialization at the expense of our generalist, I fear that we will be leading ourselves toward extinction. Sound too extreme? Who will be the individual overseeing the entire perspective of the case? The investigator? The prosecutor? The defense attorney? These roles represent the various advocate positions in our criminal justice system. We have worked most of our professional lives protecting the neutrality of the physical evidence. We will always need those individual criminalists with a broad understanding and general knowledge of physical evidence to maintain the overall perspective, to "direct the orchestra." There you go, think of this person as not the lead chair of any particular section, but as the conductor.

Think of criminalistics as an orchestra. Each of the specialization areas is required to play a symphony. But a conductor keeps them all together, playing the same orchestral piece, in the same time, and lets each section know when their part is required, when solo's begin, when they end. And think of the tools that we acquire, no matter how sophisticated, as a musical instrument.

1. O'Hara and Osterburg, An Introduction to Criminalistics, 1949
2. Kirk, Paul, Crime Investigation, 1952



Ken Goddard

The Future of Wildlife Forensics

Had an investigative reporter asked the first ten forensic scientists he or she ran across at a CAC meeting twelve years ago, "what do you see as the future for wildlife forensics?" the most likely answer would have been "huh?" or "wildlife what?" or simply "what are you talking about?"

Sad to say, these would have been perfectly reasonable and understandable responses. In 1988, the year the National Fish & Wildlife Forensics Laboratory in Ashland, Oregon, first opened it's doors, the total number of full-time wildlife forensic scientists in the world could have been counted on the fingers of two hands...with several fingers left over.

Now, twelve years later, a polling at a CAC meeting on the future of wildlife forensics would almost certainly yield some very different answers.

Thanks to the continuing efforts of those first few state wildlife forensic scientists, coupled with the 30-odd members of our own lab staff, and another dozen-or-so wildlife experts in other far reaches of the world, wildlife forensics is finally making its mark as a new and fascinating branch of forensic science. Wildlife officers throughout the world now have access to crime labs and forensic scientists with the resources and expertise to take on the species and sub-species identifications of wildlife related parts and products. And as such, well-established forensic science principles are now being applied to the analysis of such esoteric evidence samples as powdered rhino horn, tincture of tiger bone, deer and elk meat, elephant hide products, ivory carvings, eagle and condor feathers, shatoosh shawls, sturgeon eggs (caviar), wolf skulls, and, perhaps most bizarre of all, fake tiger penises.

Never let it be said that wildlife forensics lacks pizzazz.

This 'coming-of-age' of wildlife forensics even received official recognition at the recent International Association of Forensic Scientists meeting in Los Angeles, where wildlife forensic scientists presented a total of 24 scientific papers and 10 posters within the Wildlife Forensics section of the program.

But as interesting as all of this certainly is, at least from the perspective of those of us engaged in the research and casework, the future of wildlife forensics is not without its problems.

Aging: The aging (determining time since death) of wildlife carcasses is one of the more vexing problems facing wildlife forensic pathologists today. For example: was the animal killed (and the product made) before 1973, when the Endangered Species Act was put into effect—or after. And, in a like manner, was the animal killed before 6:00 AM on a particular morning (before the hunting season officially started) . . . or shortly after?

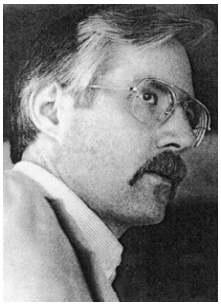
Thus, what we need to find— sometime in the hopefully not-too-distant future— is a physical characteristic of these creatures that changes in some linear or mathematical way with respect to time, but remains independent of fluctuating temperature and pressure effects. What that characteristic might be isn't even remotely clear to us; all we know is we need it, and fast.

The Definition of Species: Species are typically defined and categorized according to where the animal lives, what it looks like, and how it behaves. Additionally, the definitions of plant and animal species are typically based on species-defining characteristics found on the whole animal; and the biological 'keys' used to categorize species almost always begin with the country of origin, and require the whole animal.

All very fine, except for one minor problem: wildlife investigators almost never

submit whole, live animals to a crime lab for identification. At the very least, the submitted creatures (or parts and products thereof) are dead, which effectively eliminates behavior as an identifying characteristic. Furthermore, the submitted wildlife parts and products are often seized from of boats and planes, which means the only ones who know the country of origin are the suspects — who are hardly reliable sources of forensic data.

So, before we can even begin our work to identify the species-sources of these materials, we must conduct extensive research to determine new species-defining characteristics that can be found on the parts and products submitted by wildlife investigators ...knowing full well that such materials could have come from species living in any part of the world. This task, alone, will keep wildlife forensic scientists (and their research collaborators) busy for generations to come!



Wildlife forensics is finally making its mark as a new and fascinating branch of forensic science

Hybrids and Mitochondrial DNA: A great deal of work has gone into researching genetic information on mitochondrial DNA molecules, and the resulting databases are extremely useful to wildlife forensic scientists ... at least to some degree. But mitochondrial DNA only offers us the mother's genetic contribution, which means we can't tell if the animal is actually a 'pure' species, or a cross (hybrid) of two closely related species or sub-species. A problem, because wildlife laws often do not protect hybrids.

So, in the future, wildlife forensic scientists are going to have to begin searching the genome for their species and sub-species defining information ... which means a tremendous amount of time and effort.

The Species-Resolving Power of Hemoglobin. Which brings us to the wonderful hemoglobin molecule, faithful workhorse in the daily effort to transport oxygen to our laboring muscles and brains. To our amazement, it seems that each species has their own variation of hemoglobin, the alpha and beta chains being different. If this holds true for all species and sub-species, in future years, we will have a new and much faster means (by lc/mass spectrograpic analysis) of positively identifying species, thus allowing us to reserve our DNA efforts for the far-more-daunting task of matching blood or tissues samples from the same individual.

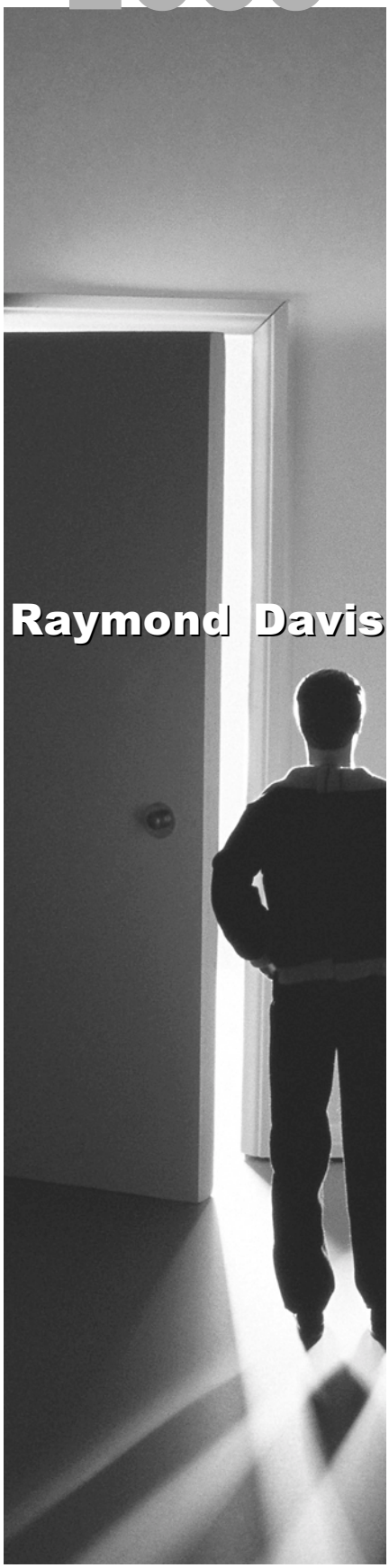
And the Matter of Written Protocols for ASCLD/LAB Accreditation. When Dr. Pepper Trail, our chief ornithologist, holds up a feather in his hand, he immediately recognizes it as (for example) an eagle feather. How does he know that? Because he's seen thousands and thousands of feathers over his career as a professional ornithologist; and, in his mind, an eagle feather is clearly distinctive, much in the same way that I can see a young woman across the room and know instantly that she's my daughter.

In effect, Pepper and I are performing a bit of mental gymnastics called pattern recognition ... much like all of us humans do on a daily basis. But this is effectively, saying, in Pepper's case, and in a forensic sense: "it's an eagle feather because I know it is." All very fine, at least as far as Pepper and I are concerned; but the courts aren't anywhere near as accepting. They want to know why he knows it's an eagle feather. In other words, they want to see a well-researched and verified protocol, upon which he based his conclusions.

Easier said than done, as our Morphology Section knows all too well. And, if you look at it from my fatherly perspective, you'll quickly understand why. Like I mentioned a couple of paragraphs ago, I'm perfectly confident that I can recognize and positively identify my daughter from 10,000 like young women. In fact, I know I can. But can I write a protocol so that all of you could too — with absolute certainty — and then testify to that identification in court? What would I possibly write? It's an interesting question.

All difficulties and grumblings aside, we do realize that we're going to have to come up with protocols for our hundreds of morphological evidence categories — if for no other reason than to continue to meet the requirements for our treasured ASCLD Accreditation status — but it won't be easy. The encouraging part: in doing so, we may learn a great deal about how the brain works with respect to pattern recognition.

So, staring into the crystal ball . . . What do we see in the future for wildlife forensics? Some daunting problems, certainly. But also some fascinating challenges that should keep us — and our second generation of young wildlife forensic scientists — intrigued and busy for many years to come.



"Nation's Crime Labs to Merge With Judiciary"

Washington: (CACNewswire) America's chief law enforcement officers, states attorneys general and hundreds of district attorneys met today in Washington to witness and offer their support to an enormous change in the criminal justice system. This historic change will obligate all crime laboratories to merge with judiciary. Beginning with the signing of the New Law Enforcement Act, no police agency will have control over what and how evidence is to be analyzed. Law enforcement agencies will no longer send evidence directly to their respective crime labs. Instead, they will be required to submit an affidavit to their respective courts requesting assistance to sue crime laboratory services.

This new system will continue to allow evidence to be submitted by police officers, district attorneys, public defenders and even private attorneys as long as they meet criteria established by this new law. All evidence analyzed by the crime laboratories and subsequent reports are made available for review after they are sent to the courts. This fundamental change in the U.S. criminal justice system effectively ends the adversarial position criminalists, crime scene specialists, latent finger print examiners and other experts have experienced over the past 125 years. Experts will now be called by the judge to testify and expert witnesses are not subject to direct and cross examination by attorneys. Their findings and opinions are presented directly to a jury in a conversational manner assisting them in answering any questions the court of jurors may have.

One nationally recognized expert said that the days of rigorous, contentious and withering cross examination so reminiscent of famous *Court TV* programs will no longer be seen in America's court rooms. The reason for this dramatic change is that all of the findings and opinions by experts are to be presented to the judge and counsel prior to trial in an informal hearing prior to any trial.

This change spells relief for the thousands of experts who testify on a routine basis across the nation. The fear and dread experienced by many experts has been the number one reason experts disliked this aspect of their profession. Although this fear has been removed, the burden now falls most heavily on them to be able to effectively communicate their finding and opinions at both the informal hearing as well as at trial. They must be able to satisfactorily answer any and all questions put to them by jurors should the need arise. One unnamed DNA expert commented that answering questions by a technically challenged group of jurors would create a whole new set of problems for experts.

Little did she realize how prophetic her words would soon become.

Since implementing the new system experts began facing a growing challenge from judges to be more adept at speaking to and answering jurors questions without the usual technical lesson they've been accustomed to. A sampling of reports from around the State of California reveal a growing problem with the new system.

Santa Barbara: A Superior Court judge reprimanded a shoe impression expert for not being able to adequately explain to the jury exactly how he was able to make his comparison between a faint, partial heel impression at the same crime scene with the suspect's shoe and his subsequent opinion that the shoe and impression were one in the same.

San Francisco: A toxicology expert was dismissed from the newly established Informal Hearing due to an inability to explain to defense counsel how the gas chromatograph / mass spectrophotometer actually analyzed the drugs in the suspect's urine sample. A replacement expert was summoned from the lab.

Ventura: A judge in a misdemeanor drunk driving case dismissed the chemical test against the defendant because jurors were not satisfied with the experts explanation of how the Widmark formula actually determines the number of drinks the defendant would have had to consume to correspond to his blood alcohol test results.

El Cajon: A judge recently dismissed crucial firearms evidence against a defendant in a second degree homicide case because the expert could not adequately explain to the jury what a match (identification) was and the underlying basis for that opinion.

Fresno: In an unprecedented act in a criminal trial the foreman of the jury in a sexual assault case dismissed the expert for failing to convince them of the reliability of their microscopic examination of semen.

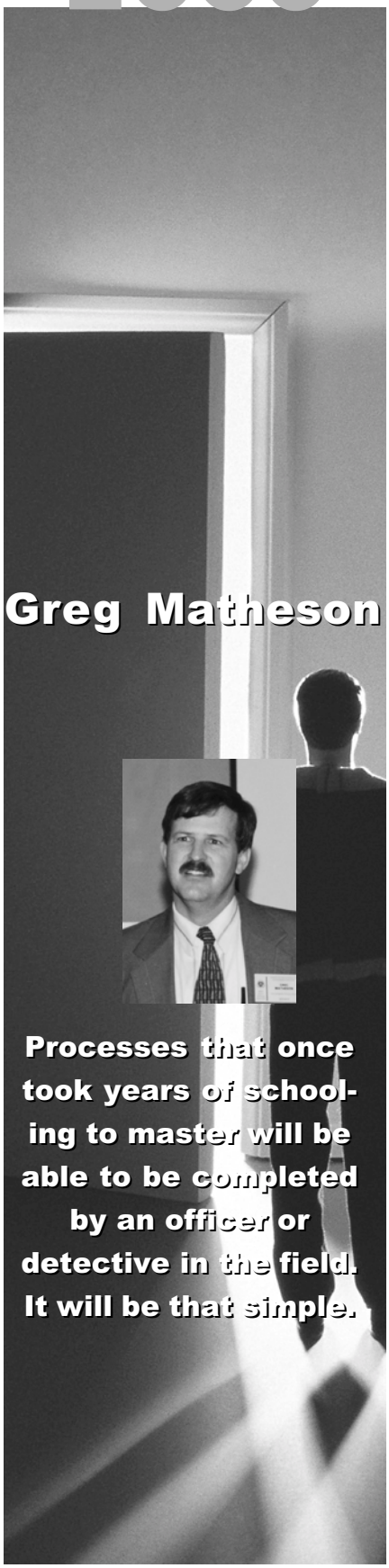
Sacramento: The governor today signed legislation requiring all expert witnesses testifying in legal proceedings to pass the state's Comprehensive Communication Examination. This 8 hour examination will require experts to write technical information into easy and understandable terms and to communicate complicated technical information to a panel of lay people in an informal, understandable and compelling manner. No expert will be allowed to testify without taking this examination and it will further require continuing education every year.

Commentary: I don't know if the criminal justice system will change that dramatically in the 21st Century. I don't even know if it's possible to move crime labs under the auspices of the judiciary. Regardless, I've always felt that it would be a great advantage for an expert witness to have a neutral standing in court. The adversarial system often sets us up to failure because both the prosecuting attorney and the defense attorney have an absolute duty to present their case as they "see" the evidence. No, as we sometimes see the evidence. Our point of view and our perspective of the evidence doesn't always fit the views held by attorneys and judges. And if your experience has been like mine, they sometimes ignore our view and the impact that evidence possesses.

Given the present situation, we must first endeavor to provide our expertise in a way that commands the respect and attention of district attorneys who must decide how it is to be presented to a jury. Second, we must strive to present ourselves, our testimony and our opinions in such a way that jurors will feel satisfied with our testimony.

I believe that each of us strives to be the fair witness at trial. And we do so without the help of the judiciary. We may never have the opportunity to be called to court and testify on behalf of the judge in a criminal case. And in the tug and pull of the adversarial system it's not always easy to be the fair witness. If we take the time and effort to practice being more adept at communicating to a lay audience, such as judges, lawyers and jurors then we can make an impact that will carry beyond the words we ultimately use.

One nationally recognized expert said that the days of rigorous, contentious and withering cross examination so reminiscent of famous Court TV programs will no longer be seen in America's court rooms.



Crossroads

As a rule, I don't understand why human beings make milestones out of dates ending in fives and zeros. I guess we need something that is generally agreed upon to signify an important point in time from every other point in time. As you know, we are entering the granddaddy of all points in time, a year ending with not just one or two zero's, but three. We are using this point in time to remember accomplishments and mistakes from the past, but more importantly, to look toward the future. Though sincere involvement in a profession should result in constant improvement and advancement, it takes something like the coming of a new year, or new century, to remind us to stop and think about where we are heading and how to get there.

As science advances, the processes associated with the analysis of evidence will become easier and more automated. Analytical instrumentation, robotics, and computers have removed many of the drudgery chores associated with the analysis and identification of unknown substances. Improvements in the processes of analysis have come at exponential rates and show no signs of slowing. Processes that once took years of schooling to master will be able to be completed by an officer or detective in the field. It will be that simple.

So where does that leave us with criminalists and the profession of criminalistics. As we enter this year of three zeroes, our profession is truly at a crossroads. We can choose to become the technicians that operate the machines and analyze a piece of evidence, or we can be criminalists that investigate crimes. Our value to the investigation is our knowledge of the scientific process. The use of unbiased analytical thought to evaluate a crime scene or a collection of evidence items, determining the appropriate questions to ask, knowing what tools to use to answer the question, and finally knowing how to interpret the information.

To move the profession forward, we need to look to the past. Our predecessors did not have the advantage of the tools we have today. What they did have was their minds. They were forced to utilize the power of their brains to analyze the situation and determine the germane questions. Today, we are more apt to use our tools as crutches to react to questions being asked by nonscientists.

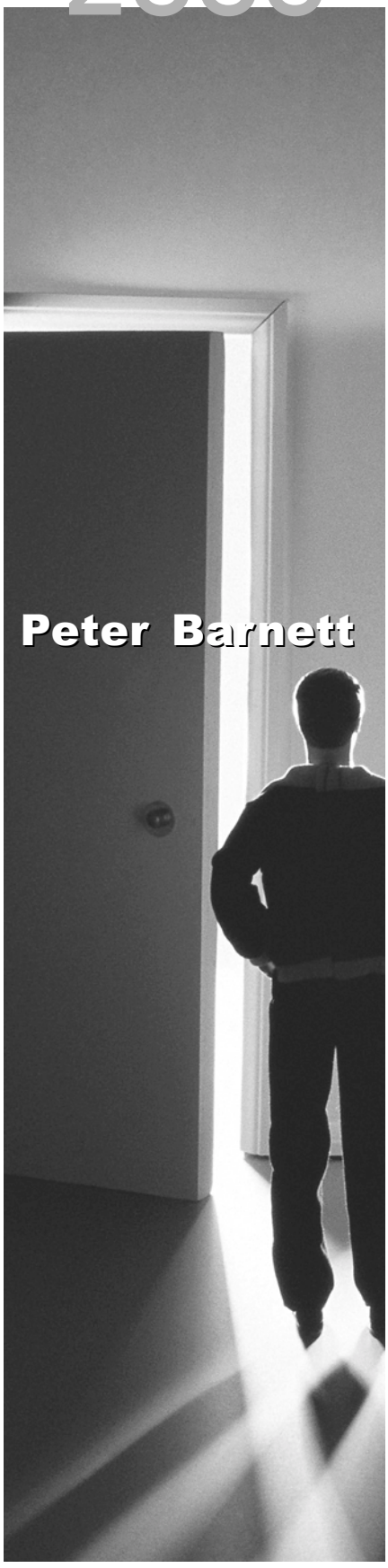
In looking toward the future, we need to unleash the power of our profession by applying everything technology has to offer to answer the questions determined by the scientific mind. We need to use technology as only one of the tools to fulfill our professional responsibility of providing for the recognition, identification, individualization and evaluation of physical evidence.

We must challenge criminalists to learn more than their specialty requires.

We must challenge managers to remember the excitement of criminalistics and to create an atmosphere that encourages learning and professional expansion.

We must challenge educators to teach how to look at the big picture and determine the germane questions.

We must remind ourselves that what we do is important, interesting, and benefits society and then challenge ourselves to do the best job possible.



Peter Barnett

New Ethics for the New Millennium?

Introduction

For the past year or two the subject of the "new millennium" has been on the minds of every person who sets pen to paper. It has been the subject of articles, books, papers, seminars, planners, and prognosticators. Whether the new millennium is different from the old will not be answered quickly, but we can confidently predict that the history of forensic science in the next 100 years will be different than the past 100 years.

We have already seen a revolution in forensic science with the development of the first new method of personal identification in a hundred years. The advent of DNA technology will have a wide-ranging influence on the practice of forensic science. Indeed, the ramifications of forensic DNA analysis have already had significant impact on the way all forensic scientists do their jobs—and the influence has not ended.

Ethics History

It has only been in the past fifty years that forensic scientists have been concerned with professional ethics. The development of the CAC Code of Ethics, in the 1950s, has served as a model for codes of ethics, or codes of professional conduct, developed by many other forensic science professional organizations. In considering whether the CAC Code of Ethics is relevant to the next fifty years, two things must be considered: The state of forensic science when the current code was developed, and the people who developed it. In the 1950s, the only means of individual identification available was a fingerprint. Fingerprint identification was generally outside the range of activities of crime laboratories and those who worked in them. The idea that people could be identified by analysis of their biological samples was a pipe dream—in fact, this idea was even considered unlikely a decade ago. Further, the people who developed the code of ethics were what is generally, and often derisively, today referred to as "generalists." In the next few years, the identification of individuals through genetic analysis of biological samples will become routine—as routine as fingerprint analyses are today. Further, in the next few years the increasing specialization of forensic science practices will place new demands on criminalists. How will these changes affect the codes of ethics of criminalists?

Ethics Definition

Before any discussion of ethics begins it is necessary to define what is meant by professional ethics. As distinguished from morals, ethics are codified rules of behavior that apply in specific situations to a specific group of people. These codified rules are based on a variety of sources: Generally accepted moral precepts, specific conduct requirements generally agreed upon by the community of people to whom they apply, legal requirements, and practical requirements. Specifically, codes of professional conduct for criminalists rely on moral considerations, generally accepted concepts of the proper practice of science, legal requirements (statutory, case precedent, and common law), concepts of professional responsibility, and basic concepts of collegiality and cooperation.

Changes to well thought out codes of ethics—which I consider the CAC Code of Ethics to be—should generally be done reluctantly and with careful consideration of two factors: Does the existing code serve to define appropriate behavior in the circum-

stances which give rise to the idea of a modification, and might the proposed modification permit professional behavior that is not desirable or in conflict with other sections of the code.

Ethical Dilemmas For The Next Millennium

To what extent is it appropriate to rely on the work done by other people in forming an opinion? Is it ethical to express an opinion that is contrary to the opinion held by the person who did that work?

In this age of specialization it is more and more necessary to make decisions based on information provided by people who only see a small part of the puzzle. Someone has to put this information together. Who is that person? An investigator? A lawyer? A scientist? In some laboratories, the samples are removed by one person, analyzed by a second, the data interpreted by a third, the statistical analysis done by a fourth, and the final report issued by a fifth. What responsibility do each of these people have about the work done by the person who precedes them in the analysis? Can the person issuing the report judge that some of the data is incorrect, unreliable, or irrelevant and not include that data in the final report that is issued? Does the person who generated that data need to be informed and have an opportunity to defend the data? In our adversary system, who has the obligation to make sure all appropriate people are informed of the existence of the data that is not included in the report.

In an era of increasing specialization, is failing to recognize one's limitations a violation of an ethical code?

Bags of evidence are submitted to the crime lab, sometimes with requests for analyses and sometimes not. These bags have to be opened by someone, and decisions have to be made about analyses to do, or not to do. If a bloodstain on a garment shows a pattern, if a cartridge submitted for entry into a cartridge case database bears a fingerprint, or if a crime scene has fiber, blood, trajectory, and footprint evidence, who is going to be the person who decides what to collect, what order to process, what the potential value of the evidence might be (in the context of the case, of course), and what all of the individual analyses imply concerning who did what, and whether it is a crime, or what crime?

Does the new millennium require new rules?

Who has the ethical responsibility to be sure that all of the scientific evidence is made available to all interested parties?

We can predict that scientific and traditional investigations will be conducted by individuals with increasing levels of specialization, all of whom may not be aware of the work other people are doing on the same investigation. Who has the responsibility of making certain that all persons who are entitled to know relevant information are provided with that information? Is it the individual laboratory scientists who do the work? The laboratory administrator responsible for all of the work that goes on in the lab? The prosecutor who is handling the case? The investigator?

Some Examples:

Weapons are recovered by the police and test fired and the projectile striae entered into a database. That information is compared with other weapons entered into the database. In some instances, based on the computer comparison, an actual comparison may be made by a firearms examiner between the newly recovered weapon and a bullet in the database. This may be done several times without any identification being made. A firearm is recovered and the same process is followed with a report that the new firearm "has some common markings with the evidence bullet, insufficient for identification."

In this case, the other firearms which were compared with the evidence bullet and which had high "scores" in the comparison might be of interest. Is this information readily available to all those who are interested? Who has the responsibility of providing this information? The technicians who do the input and get the initial computer "hit?" The firearm examiners who do the actual physical comparison? The police investigators who have recovered all of the evidence? Are the laboratory record keeping systems even adequate to be sure this information can be retrieved?

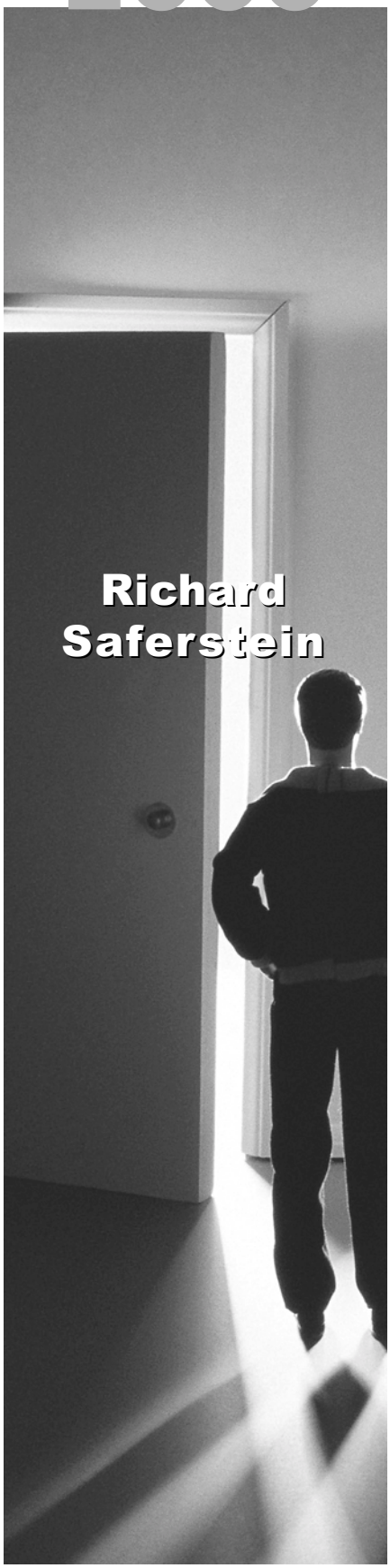
With increasing automation of laboratory procedures more and more data is generated electronically and stored in digital format. This includes not only analytical

data, but chain of custody records, procedure information, photographs, working notes, diagrams, etc. What information must be retained and what can be discarded. How is this information made available to those who need, or are entitled, to have it. If manipulation of data requires a proprietary application program to read, is this program made available to anyone who needs to review the data? If photographs are provided on compact disks is there any requirement that they be cataloged, described, or other means of convenient retrieval provided. (Reviewing 400 photographs on four floppy disks is a LOT more difficult that reviewing the same number of prints.)

We can fantasize about the laboratory of the future in which the " reporting forensic scientist" is preparing a report on a burglary investigation (speaking of fantasy). Cigarette butts at the scene have the suspect's saliva, a shoe print shows a manufacturing defect that appears also in 20 percent of the same types of shoes that were manufactured by the manufacturer of the shoes, and the screw driver in the suspect's pocket has the same class characteristics as the jimmy marks at the scene. An error in the DNA analysis has failed to recognize the absence of an allele that should be present if the saliva is the suspect's; the shoe print examiner failed to realize that there are widely available knock-off shoes with the same sole pattern as the suspect's shoes; and the marks that the toolmark examiner thought were class characteristics are actually damage to the screwdriver that is probably unique (not to mention the paint transfer, not even noticed by the toolmark examiner, on the shank of the screwdriver which came from contact with the frame of the window as the window was being jimmied open).

Is the "reporting scientist" expected to be able to recognize all of these problems in the evidence he is reporting? Do we just leave this problem to the investigator or prosecutor who received the reports from each of the specialists?

Who bears the ultimate responsibility of interpreting and reporting laboratory results? If codes of ethics are to have any meaning, they must include responsibility to be sure that the correct information is furnished to the consumer so that the outcome is based on consideration of the correct information. With specialization and bifurcated responsibility, what is the ethical responsibility of each of the players in the justice system. Where do we draw the line between professional judgment, ethical responsibility and, ultimately, legal culpability? Does the new millennium require new rules?



The New Millennium: Ready or Not Here It Comes

As we enter the new millennium, there's just cause for optimism about the future of criminalistics. This optimism is an outgrowth of what I consider to be the single most important accomplishment of the twentieth century—the triumph of democracy over totalitarianism, namely fascism and communism. Forensic science can only grow and flourish in a democratic environment; where truth and justice are the paramount pillars of law. Sure, many a dictatorship or quasi-democracy has and will continue to pay lip service to forensic science, but meaningful and serious contributions of science to law remain empty gestures when efficiency and political dogmatism are the underpinnings of a judicial system. Forensic science is the basic nutrient of a vibrant democracy that seeks to protect truth even at the cost of impugning the establishment.

As we enter the new millennium, we also enter the golden age of democracy. Western values have in many quarters overcome the forces of oppression; many countries in the old Eastern-bloc and in Asia are truly endeavoring to empower the destiny of their nation to their citizenry. This movement can only bode well for criminalistics and other forensic science services. Sensitivity to human rights and justice and an abhorrence for convicting innocent people has nurtured the growth of criminalistics and its prodigies in established democracies. As democratic values take hold throughout the civilized world, we can expect adolescent democracies to emulate established democratic institutions and to point with pride to the vitality of their forensic science services. This trend will certainly give criminalistics more of an international flavor in the new millennium both in terms of its participants and its published literature.

The last quarter of the 20th century also witnessed the triumphal emergence of free market forces as dominant navigators of our economic destiny. The freedoms afforded by democratic institutions foster an environment of economic stability and provides reward incentives that are the basic ingredients for dynamic and successful economic achievements. Interestingly, significant population growth and the complexity of technical advances throughout the 20th century have encouraged specialization in many areas of our economy and in society in general. Conglomerates faltered in the latter half of the 20th century as industry moved to concentrate on their core business. Likewise, special teams became the norm in football, and relief pitchers and designated hitters were critical to successes in baseball. Criminalistics will not escape the undercurrents of social and economic trends toward specialization. As much as some may bemoan the passing of the generalist, the trend of events is obvious. Criminalists in the new millennium will be trained in limited areas of conduct and will have a narrow focus of responsibility both in the laboratory and in the field. Further, we can expect the ranks of crime scene investigators to be filled by an ever growing population of police investigators. What is going to prove to be less palatable to our profession will be the encroachment of police personnel into areas that are today within the exclusive domain of forensic scientists.

As technology grows more and more user friendly, police will be tempted to become more aggressive and territorial in their desire to satisfy an ever growing and better educated police population. The entrance of the police criminal-profiler into what was once the exclusive domain of forensic psychologists is a preview of such encroachments and the potential sources of friction and conflict that lie in wait between scientist and investigator in the new century. The new millennium finds criminalists and their brethren at an ever increasing disadvantage to counter this

trend. As the criminalist population fills with entrants academically trained to focus on laboratory solutions but very parochial in their outlook, police investigators seem poised to capture the attention of the public and legal community with exploits fueled by media publicity and well oiled public relation machines. For example, given our healthy respect for rapid technological advances, does it seem so farfetched to think of police personnel conducting DNA determinations at crime scenes in the early decades of the new century?

In the same vain, the free market mentality that so dominated the 1990s puts at risk the concept that criminalistic services best reside within the structure of governmental institutions. Forensic DNA analysis has already attracted a vibrant following in the private sector. Also, a good number of forensic toxicologists are today employed in the private sector engaged in workplace toxicology testing. The semi-privatization of the English Forensic Science Service is another clear omen of things to come in the United States. Forensic science stands as a ready target for the bean counters who want to streamline government and make it more efficient and accountable. The conversion of public supported forensic laboratories, in whole or in part, to the private sector or to quasi-private status is on the agenda for the new millennium. Nevertheless, bureaucracies die hard, and this is one trend that is bound to evolve over many decades, but evolve it will. Make no mistake of it, powerful free market forces have been unleashed and it will be foolhardy to deny their impact on forensic science and other vulnerable government services.

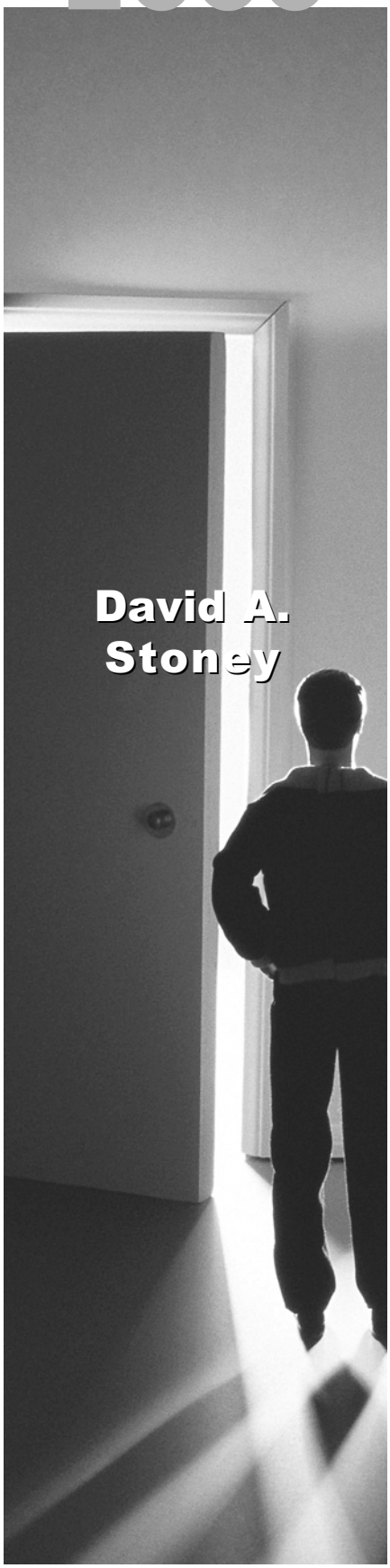
As technology grows more and more user friendly, police will be tempted to become more aggressive and territorial in their desire to satisfy an ever growing and better educated police population.

One will be foolish to try to predict technological advances in the early years and decades of the new millennium. However, it's going to be difficult for the 21st century to match the developments that came to the forefront in the last half of 20th century. Chromatography, electrophoresis, mass spectrometry, spectroscopy, and microscopy are still dominant technologies in the forensic laboratory. Sure the bells and whistles have dramatically been altered by computer technology, but basic analytical science has on many forensic science fronts remained largely in place in the last 30 years.

The spectacular emergence and impact of DNA on our profession in the last decade of the 20th century has instilled a sense of awe and wonder, but who among us is willing to predict that biological markers will go beyond DNA in the next 1000 years? Sure there will and must be changes in forensic technologies, but my knowledge and experience leads me to believe that the majority of these changes will be incremental in nature and should not disturb the core technologies of the analytical sciences as we know them today. However, one thing is for certain, when changes do take place, a cadre of venders will be more than willing to market their wares for forensic consumption. The 20th century has bestowed on criminalistics a recognition as a legitimate science worthy of attention by all segments of our society.

For those readers who find my words a bit off-base, relax and take solace in the knowledge that if I was asked in 1899 to prognosticate developments in the new century, I surely would have failed miserably. Likewise, I'm also not even adept at predicting movements of the stock market. However, one thing is for certain (or nearly certain) human greed, vice, stupidity, addiction, jealousy, and hate are inalienable characteristics of human behavior that will remain with us into the new millennium and beyond. This ensures that crime will continue to a basic condition of human existence. In other words, there will be no going out of business signs for the criminalist profession in the new millennium.

Now fasten your seat belt, get ready, and let's enjoy the ride into the new millennium.



Criminalistics in the New Millennium

David A. Stoney

What will criminalistics be like in the New Millennium?

The technology, of course, will change. And it will change *more* than we can guess, not less. But I'm inclined, at least initially, to look toward our spiritual side. Bowing (as David Crown put it so tenderly in 1977) to St. Paul of Kirk (1), to what extent will our progress be "technical rather than fundamental, practical rather than theoretical, transient rather than permanent?" (2).

What is criminalistics now, professionally and theoretically? What did we accomplish this century? What might we do in the next?

Ethics and Professional Practice

The tone of our professional practice was set very well in the *past* century (3). My favorite quote defining the challenge of our work is from 1882 in Tidy's Legal Medicine:

"For the medical jurist, whose object should be the interests of justice, to hesitate where science is positive, is as unjustifiable as for him to speak without reserve on those details of our science, where the limits of exact scientific knowledge are undefined. There is a scientific certainty which only the coward treats as uncertainty, and there is an uncertainty which only the boldness of ignorance ignores." (4)

Not a bad start as a professional ideal. And in this century, the CAC, by developing and discussing its detailed ethical code, has put this ideal into the context of professional practice. The CAC Code is exceptional and exemplary in this regard, and its special nature should not be overlooked. Moreover, in California there is a tradition (following St. Paul) of sophisticated, ethical laboratories available to both the prosecution and defense. This has provided a professional setting where practitioners must continually confront the (irritating, time-consuming, frustrating) ethical issues and conflicts to which Tidy so eloquently refers. This is, without a doubt, one of the greatest contributions to forensic science in this century. And correspondingly, one of the greatest remaining challenges for forensic science in the United States is the extension of this availability of services and the professionalism of their delivery.

Fundamental and Theoretical Development Part I: Academics

Locally, and in the U.S. overall, our marks aren't quite so high on fundamental and theoretical development. Certainly not in academics. We had a great start. Great intentions. But overall, in this last quarter-to-half century we have failed in one most critical area: we have no educational foundation to our profession. To those who study professions, this means we do not, in fact, have one (5). All professions have professional schools that teach the fundamentals, methods, and ethics. These are the foundation for professional practice. Although criminalistics has many of the other hallmarks of a profession (societies, journals, certification of sorts), we lack the most basic, defining one. It is the *commonality of the foundation* that is the critical point. It is through professional schools and academic research that the fundamental theoretical development comes.

In the absence of this defining educational foundation, we have seen the American Society of Crime Laboratory Directors emerge as an important progressive body, introducing programs for accreditation and standards that hold the profession together. But unfortunately, this doesn't address the fundamental development of criminalistics, practical (necessary and important) corporate needs are addressed, but

not theoretical ones. You can't make an ivory tower out of steel. It's too practical.

The handful of U.S. academic institutions that have criminalistics programs don't address the problem either. What's missing? Two things. First, a standard curriculum. If the academics don't agree on this, they don't agree on the core fundamentals. (The debate and agreement is exactly the type of fundamental and theoretical development that we need.) Secondly, the profession as a whole needs to buy into the process: the academic training must be required in order to practice. In every other profession there is a license to practice. Do we hold our own profession in so low esteem as to be the exception?

A major goal for criminalistics practice in the United States as we move across this inspiring, yet artificial threshold, is to establish an academic foundation for our profession and to require this minimum professional education in order to practice.

I keep saying United States because in the United Kingdom, and in Switzerland there are academic centers that are in direct pursuit of fundamental principles of forensic science. Closely associated with professional practice, these have served as focal points, inspiring and coordinating the individual contributions from practitioners world-wide.

[W]hen we define our profession *responsively* rather than fundamentally, we find ourselves justifying our *existing* professional practices, rather than questioning them and developing new ones.

Fundamental and Theoretical Development Part II: Practitioners

Twenty-five years ago there was very little research being done, at any level, relating to the interpretation of results. I think it is fair to say that we, as a profession, didn't think it was really necessary. This was certainly the perspective I had from academia as a graduate student. Ed Rhodes' dissertation on the kinesiology of the hand in relation to handwriting was considered irrelevant, as was Biasotti's work on striations, as was Kingston's on fingerprints. . . and on and on. Over the years research relevant to interpretation began to trickle in with surveys of one sort or another, many of these out of the Home Office, some out of academic programs, and some from practitioners. Contrasting those early efforts with today, we see a dramatically greater appreciation of the need for research that will provide objective criteria for our opinions.

Sorry to say, the primary credit for this is due to the legal profession. Some attorneys finally realized that we didn't necessarily know what we were talking about - that there might be a difference between our "best interpretation" and any real knowledge about what was going on. Some of them questioned the validity of our casework experience to serve as a foundation for our opinions. And *finally* a scientist or two, outside the profession, got involved. This external became quite intense with DNA analysis. The stakes got high enough in an area where conventional scientific disciplines had some expertise. Once the lawyers really woke up and poked around, guess what? Little objective foundation for our opinions. Poof to handwriting. Poof to hair. Poof to toolmarks. Why didn't we encourage the likes of Rhodes and Biasotti year's ago?

What about the Twigs and Swigs? Well, not bad. Not bad as a rapid, collective practitioner response to professional threat. Generally speaking one doesn't build a profession from the bottom up, but then most professions offer some sort of theoretical development and guidance from the top. Standardization of methodology and interpretation of results are critically important and these forums can focus issues in forensic science, coordinate research and guide the professional practice.

But will they provide the missing fundamental, theoretical foundation? Not directly, I'm afraid, although they can contribute much by directing and inspiring research efforts. The Twigs and Swigs were formed out of necessity in response to increasingly sophisticated legal challenges. Motivated by these challenges, and without an institutional base, they cannot be expected to endure and develop once the challenge is addressed (6). Furthermore, when we define our profession *responsively* rather than fundamentally, we find ourselves justifying our *existing* professional practices, rather than questioning them and developing new ones. As useful and important as consensus and standardization are, we must not confuse them with knowledge.

The name change from Technical Working Groups to Scientific Working Groups suggests that we are, indeed, a bit confused. The change addresses legal perceptions nicely, but does it mean anything? John Davis, as editor (and near sole-author) of The Technician in the Police Laboratory (7) certainly wouldn't have made the name change. He made an explicit distinction between a *technician*, who used scientific methods, and a *scientist*, who spent his time in a research laboratory, pushing back the frontiers

of knowledge. If we confuse these concepts we will once again confine our progress to the "technical rather than fundamental, practical rather than theoretical, transient rather than permanent." Avoiding this confusion, even as we encourage and support these practitioner forums, is an important challenge to the fundamental development of our field.

Who Needs the Fundamentals? Is there Any Real Problem?

There is a lot of talk about fundamentals and theory. Is there any real problem? Are the fundamentals of criminalistics any different from those used in any science? You know the answer to this, of course. You know it every time you watch the testimony of a Ph.D.-level scientist who lacks these fundamentals, whose presentation may be honest, but the effect of which, in its ignorance and irrelevance, is not. Useful to both prosecutors and defense attorneys alike, such testimony is not uncommon. A good example is the recent testimony of a geneticist and a computer scientist to their research results that the chances of two fingerprints being *identical* (in say four minutiae) is less than one in 10 to the 27th power (8) — a study that fails to consider the most basic concepts of criminalistics as applied to the comparative process (that prints from the same source will not be identical).

The scrutiny and participation of non-forensic scientists in our profession has always been a challenge and it will be greater in the years ahead. Other scientific disciplines have much to contribute, but they are often naive with respect to the problems they are trying to address. At the very least, they can contribute by challenging our assumptions, making us squirm and making us respond to the very real needs. The problem with questioning their forensic expertise, by the way, is that we, as a profession, *haven't made it clear what that is.*

Technology

Our new century will see amazing technological changes that will transform how we do our casework and that will greatly increase the efficiency and discriminating power of our methods. These changes will be exciting. I look forward, in particular, to those that will make the analysis of trace evidence more efficient (9). But, in the present context, we must give these technical advances their proper emphasis, and so end here.

References

(1) At the AAFS meeting in San Diego in 1977, the first I attended, there was a joint session of the criminalistics and documents sections, "Should Criminalists Do Document Examinations." Marty Blake, who has the full transcript of Dr. Crown's remarks (including the immortal commentary on the criminalistics approach "it doesn't matter if you're looking through a bucket of barf, or at a questioned document, the examination is the same"), may have an interesting perspective on it.

(2) Kirk, Paul L. "The Ontogeny of Criminalistics," Journal of Criminal Law, Criminology and Police Science, Volume 54, pp 235-238, 1963.

(3) Stoney, D. A. and Dougherty, P. M. "The Microscope in Forensic Science: Forensic Microscopy in the 1890s and the Development of the Comparison Microscope," in More Chemistry and Crime, Samuel M. Gerber and Richard Saferstein, Eds., American Chemical Society, WDC, 1997, Chapter 6, pp. 107-135.

(4) Tidy, C. M. Legal Medicine, Vol. 1, Wood, New York, 1882, p. vi.

(5) Stoney, D. A. "A Medical Model for Criminalistics Education," Journal of Forensic Sciences, Vol. 33, No. 4, pp. 1086-1094, July 1988.

(6) They'll suffer the same fate as a crime lab that receives lump sum multi-million dollar funding in response to a heinous crime and is left without an operating budget.

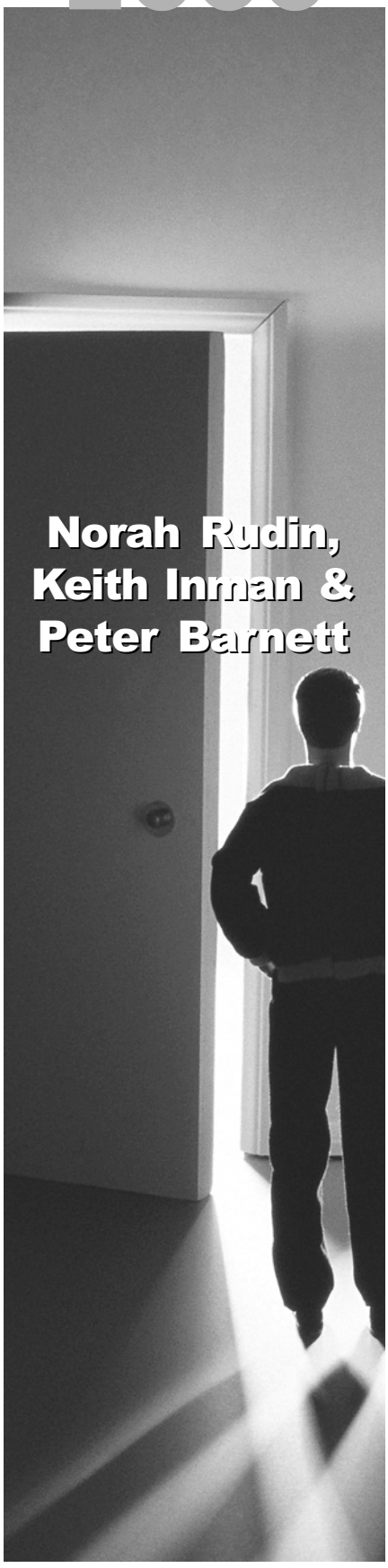
(7) Stoney, D.A., The Technician in the Police Laboratory: Contributions of John E. Davis, The Microscope, Vol. 37, No. 2, pp. 125-128, 1989.

(8) US vs. Byron Mitchell, Daubert Hearing before J. Curtis Joiner, J., July 7-13, 1999.

(9) Stoney, D.A. "Options for Computer-Assisted Polarized Light Microscopy," to be given at the 2000 AAFS meeting in Reno. See you there!

2000

CRIMINALISTICS



Norah Rudin,
Keith Inman &
Peter Barnett

The Purloined NanoBioSampler

The year is 2050. The profession of forensic science has finally been professionalized and unified. After completing their decade of criminalistics post-doc training, all criminalists are now required to take and pass the comprehensive IKR (Internationale Kriminalistiks Registry) examinations which traces its origins back to the old American GKE. Not everyone is happy with this situation.

2:00 AM, Sunday morning. A crime is reported in the Berzerkely computer laboratory in a remote region of the an alternate reality called California. The two scientists responsible for continuing development of the DNASynthoComp computer have been found dead in the laboratory. It is a bloody scene, relatively uncommon in the 21st century, so all three on-call criminalists are called to the scene. The coordinates of the scene are transmitted directly to the integrated GPS units in each criminalist's personal hover car, so they get an extra 10 minutes of sleep on the way to the scene.

2:30 AM. They take a few moments to chat before entering the scene:

DNAtyper794: I had the oddest conversation with my old friend who is now on Mars Colony. He received most of his training back in the late 20th century when everyone was DNA happy and the emphasis was on specialization. He's tried several times to become IKR-qualified and failed. It's really hard to get training out on Mars. If he doesn't pass this time, he will be out of a job. He sounded really desperate. I hope he doesn't try anything stupid.

Criminalist976 (a neophyte criminalist): Wow, what a concept! You mean there was a time when limited criminalists were allowed to practice with only their specialist knowledge?

GunIDer:135 Yes, believe it or not, many in the profession felt that was the way to go. Good thing they all came to their senses. If all you could do would be to watch after the analytical computers, and occasionally replace a mutating Biopack processor, what kind of a job would this be? The only part of this job that is interesting is going to the crime scene to decide what evidence is important and what tests should be run, and later integrating all of the data. Where would all those limited criminalists be these days?

DNAtyper794: Well, it's too bad about my friend, but it shows what happens when you can't get your pension until you are 130 ñ a lot of folks trained in the last century need to be upgraded. Let's concentrate on the scene at hand. Been a long time since I've been at a scene with real blood and I'm looking forward to getting my hands on it.

Criminalist976: Shouldn't we talk to the investigator first so we have some clue what we are looking for? He's already been through the HoloProjection of the scene and interviewed some of the witnesses over the CyberVideo link.

GunIDer135: Good point.

A group CyberVideo link is established.

Cop8957: As you know, what we have here is a double homicide. These two scientists, the DNA specialist and the computer specialist, had apparently worked together harmoniously for years. Recently, however, they had been observed in arguments in which it was apparent that the biologist's only concern was with the nucleotide sequences and the computer guy's only concern was with bits and bytes.

Their colleagues reported that these arguments had grown more and more animated recently. Now, all of a sudden, they're both dead. I've never seen anything quite like it.

DNAtyper794: OK, thanks, we'll see what we can get. Meet you for breakfast when we are done?

Investigator: Fine, I'll keep my CyberCafe link on and order us all breakfast. The usual?

3:00 AM. The three criminalists enter the scene and begin to process it. The DNAtyper is observed cutting samples from the clothing of the two victims, and taking swabs of bloodstains underneath them on the floor, scanning these samples with his NanoBioSampler and finding out the obvious. The GunIDer spent his entire time at the scene making barrel and breach face casts of the gun collection of one of the deceased scientists who was a firearms collector, and kept his collection in the lab for security reasons. The criminalist neophyte is the only one of the three that seems to note that the two scientists stabbed each other to death.

6:00 AM. The criminalists pack up their stuff and disperse back to their respective offices where each sets up a CyberCafe link by putting on his CyberView goggles and accessing the secure band frequency reserved by law enforcement for such conferences.

6:30 AM. GunIDer135: Well, the coffee is cold and the doughnuts are stale. I guess some things never change.

Cop8957: The food servos never seem to work very well at this hour in the morning. Don't know whether it is overload on the power grid or the programmers do this on purpose.

DNAtyper794: Back to our little crime, I've established with certainty that all the blood at the scene is from the two victims.

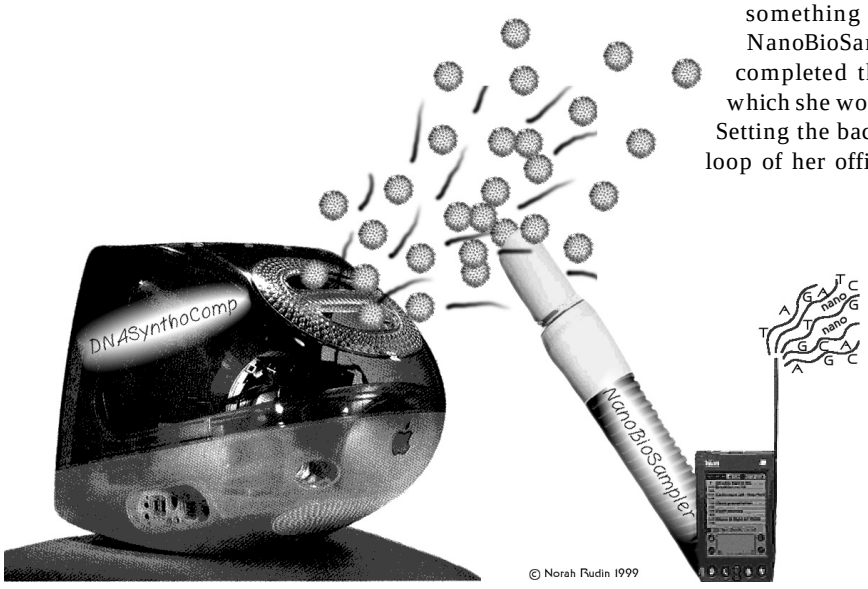
Criminalist976: What was the pattern of the blood spatter—anything unusual or unexpected?

DNAtyper794: Well, I checked the World database twice, and I'm sure the types are correct. No one else's blood was at the scene

GunIDer135: I compared all the guns in the collection with the World database of guns. I found that all these guns were manufactured before all guns were test-fired before they were sold, and records kept of the bullet striae patterns. None of them match any of the guns in the database, even with extended computer simulations for predicted wear of barrel markings.

Cop8957: Uhm—did anyone happen to collect the antique knives that the victims used to stab each other to death?

7:00 AM. As the conversation continues, the Criminalist neophyte realizes something is amiss. She has an idea, but she needs a NanoBioSampler. She is frustrated that she has not yet completed the one-week advanced training course after which she would be given her own NBS, but she has an idea. Setting the background of her CyberCafe projector to run a loop of her office background, she continues to engage her colleagues in aimless conversation while she sneaks off to the Forensic Mobile Unit and surreptitiously purloins her colleague's NBS and returns to the crime scene. She sets the unit to "robotic autosample" and sends it into the crime scene. When the scenescan is completed, she changes the setting of the NanoBioSampler to "Determine Bioactivity," and hits the "execute" activator. The Biopack processor struggles with the analysis for an unusual number of gigglecycles, but finally issues a report. When she reads the report she realizes her suspicions are correct: The



samples recovered from the DNASynthoComp's internal environment moderation port reveal the weapon and suggest the perpetrator. A few moments later her suspicions are confirmed, but she realizes she cannot report her findings to her colleagues. She leaves the investigator to keep them busy and contacts his partner.

8:00 AM. Criminalist: I think I've solved your partner's case, but my partners have been affected and they are now useless. You have to help me.

Cop9007: OK, but make it fast and this better be good.

Criminalist976: Well, here's what I think. We know that the DNASynthoComp is powered by a DNA BioPack. In this particular model, it directs the synthesis of bioactive materials in the search for a drug to reverse the short term memory loss in Alzheimer's patients. The NanoBioSampler reported that the sample from the vent area contains a "possible long term memory antagonist." When I queried it further, I found an unusual pattern of repeating amino acids specified by the DNA sequence coding for this long term memory antagonist. There are long stretches of DNA triplets coding for Glycine Lysine Glutamic acid. I thought to ask for the one letter amino acid codes for these amino acids. Turns out these long stretches are composed of GKE GKE GKE. This was the clue I needed.

I remembered a brief conversation we had just before we started this scene. A colleague of ours is apparently getting a bit irrational about his inability to pass the GKE and is concerned for his job. I checked the DNASynthoComp user log and found a hacked access linked to a computer which is registered to him. I then accessed the video records from the G-O-Cam in his study and watched as he managed to hack into the DNASynthoComp. He introduced a computer virus that changed the programming to direct the DNA fragments normally used to synthesize the memory agonist such that they now direct the synthesis of a compound long term memory antagonist.

From what I have heard about the victims and seen with my colleagues, this virus has the affect of destroying a person's general knowledge, leaving only that more recently learned, highly specific knowledge. I have apparently remained unaffected because I have only recently acquired general knowledge, so it is still in my short term memory. The viruses are programmed to be self replicating, removing a safety feature of the bioactive material normally synthesized by the computer. They apparently begin to multiply and couldn't be contained in the computer. They exit via the fan vent. I put it all together when I realized that the forensic training and development laboratory is just across the hall. Apparently his idea was that everyone would forget their generalist training so his lack of the same would not be noticed, and he would still have a job. What I don't know is if the effect is reversible.

The criminalist neophyte is the only one of the three that seems to note that the two scientists stabbed each other to death.

Cop9007: Well, you've convinced me, but now we have another problem. Do we report this to the Violent Crimes Unit or the CyberCrime Unit? You know how territorial they are.

Criminalist976: How about we leave it to them to resolve it and tell them they shouldn't open their e-mail if they can't or we'll infect them with the virus.

Cop9007: What do you think happens to an attorney who forgets all generalist knowledge?

Criminalist976: I think I don't want to go there.

5:00 PM, Monday afternoon.

Cop8957: You'll be pleased to know that we apprehended, tried, and convicted your colleague. His sentence is a lifetime ban on practicing the profession of criminalistics.

Criminalist976: Legitimately, at least.

Cop8957: Now what do we do with your partners. I'm getting really tired of listening to them babble about DNA and firearms.

Criminalist976: I guess that will just have to wait until—the next episode of ***FutureCrim***.

About the Authors

Stuart Kind is a past president of the International Association of Forensic Sciences and of the Forensic Science Society. He is a former director of the Home Office (Forensic Science) Central Research Establishment and Visiting Professor in the Univ. of Strathclyde. His recent book "The Sceptical Witness" (ISBN 0 9533987 0 6) has received rave reviews in the forensic science, legal and literary press and was short listed for the "Gold Dagger (non-fiction) Award" of the Crime Writers' Association in the UK. He was Founders Lecturer for Fall 1988. His web site is at www.forensic.demon.co.uk. Stuart reaches his 75th birthday on Ja. 21, 2000 and drinks Jameson's irish whiskey.

Jerry Chisum is a past president of the CAC and retired from the CA-DOJ in 1998. He teaches crime scene reconstruction.

Frank Cassidy retired in 1995 following a long and distinguished career with the California Dept. of Justice lab in Santa Barbara.

Bob Blackledge has published previously in the *CACNews.*

Carol Hunter is a past president of the CAC, and has been in forensic science for over twenty years.

Ken Goddard is the author of several novels including the recently published "First Evidence" and is director, National Fish & Wildlife Forensics Laboratory, Ashland, OR.

Raymond Davis teaches "Courtroom Presentation of Evidence" through his firm, Quantum Communications.

Greg B. Matheson has been a criminalist with the Los Angeles Police Department for 21 years. He is currently assistant director in charge of firearms, serology/DNA, trace analysis, and field operations.

Peter D. Barnett is a criminalist in private practice with Forensic Science Associates in Richmond, CA. He has a B.S. degree in criminalistics from U.C. Berkeley where he studied under Paul Kirk. He worked briefly for the San Diego PD and for the past 30 years he has been in private practice. He has served as editorial secretary and president of the CAC. He is a Fellow in the criminalistics section of the American Academy of Forensic Science, and a diplomate of the American Board of Criminalistics. He is a long-time member of ASTM Committee E30 on Forensic Science and has served as chairman of the Criminalistics Subcommittee and as chairman of the Main E30 Committee. He is currently the CAC representative to the Examination Committee of the American Board of Criminalistics. He continues to make a last ditch effort to preserve the notion that everyone who works in a forensic science laboratory ought to be familiar with all of the work that goes on in the laboratory. The opinions expressed in his contributions to this issue of the *CACNews* are his own and reflect the views of all other right-thinking entities.

Richard Saferstein, Ph. D. is a forensic science consultant. He retired as chief forensic scientist of the New Jersey State Police Laboratory in 1991 after serving 21 years. During his career as a government forensic scientist and a private consultant, Dr. Saferstein has testified in over 1,000 criminal and civil cases. Prior to his coming to the New Jersey State Police in 1970, he was employed as a forensic chemist with the Treasury Department (1964-1968) and served as an analytical chemist with Shell Chemical Co. (1969-1970). Dr. Saferstein is the author of over 35 technical papers covering a variety of forensic topics. He has also written a widely used textbook on the subject titled Criminalistics: An Introduction to Forensic Science- 6th edition (Prentice-Hall, 1998) and has edited Forensic Science Handbook, Volumes I - lII (Prentice-Hall, 1982, 1988, 1993), reference texts dealing with important forensic science topics.

David A. Stoney has a B.S. in chemistry and criminalistics, an MPH in forensic science and a Ph.D. in forensic science, all from the University of California at Berkeley. He worked for six years at the Institute of Forensic Sciences Criminalistics lab in Oakland, CA and served as editorial secretary of the CAC for two years. Dr. Stoney left California in 1985 to run the forensic science program at the U. Illinois at Chicago. In 1994 he left UIC to become director of the McCrone Research Institute in Chicago.

Keith Inman holds a B.S. and M. Crim., both from U.C. Berkeley, and is a fellow of the American Board of Criminalistics. He is currently employed as a senior criminalist by the CA Dept of Justice DNA Laboratory. Mr. Inman has co-authored ***An Introduction Forensic Analysis***, CRC Press, 1997. He teaches a variety of general forensic and forensic DNA courses for UCB extension, and online, for Knowledge Solutions. Visit the ***Forensic Education and Consulting*** web page at www.forensicdna.com. His opinions are his own, but anyone who doesn't have one can have his.

Norah Rudin holds a B.A. from Pomona College, a Ph.D. from Brandeis Univ., and is a diplomate of the American Board of Criminalistics. She divides her time between consulting, writing, and teaching about forensic DNA and forensic science as well as more general topics in biology. Dr. Rudin is active as a consultant for forensic DNA laboratories and as an expert witness for both prosecution and defense. She has co-authored ***An Introduction Forensic Analysis***, CRC Press, 1997, and is also the author of the ***Dictionary of Modern Biology***, Barron's Educational, 1997. Dr. Rudin teaches a variety of general forensic and forensic DNA courses for U.C. Berkeley extension and online, for Knowledge Solutions. Visit the ***Forensic Education and Consulting*** web page at www.forensicdna.com.

Q & A: How to get started in Firearms & Toolmarks Identification?

Q: *I am interested in possibly pursuing a career in firearm and toolmark identification. Any information is appreciated.*

—Shane

A: The first group you should become involved with is AFTE (The Association of Firearm and Toolmark Examiners). AFTE has a quarterly journal and annual training seminars. The next meeting will be this coming spring in St. Louis and the one following is in Newport Beach, CA. Contact Membership Secretary Raymond Cooper, SW Inst. of Forensic Science, P.O. Box 35728, Dallas, TX 75235 for membership information. The Association also has a scholarship program. In addition to the annual meeting (Spring Training Seminar) there is a mini-meeting on the east coast for members in that area in the fall and the So. Cal. Firearms Study Group holds several unofficial one-day gatherings a year. In addition the AZ. Dept. of Public Safety and the So.Cal. Firearms Study Group hold a two-day research gathering in conjunction with the Yuma Army Proving Grounds each fall to study exterior ballistics and related phenomena. Many of these require some affiliation with a lab or AFTE to gain entry. I think a bonafide student should be able to attend most if not all. Try to attend the SHOT (Shooting Hunting and Outdoor Trades) Show to learn what is out there. Check around for cartridge collectors or arms collectors associations or shows in your area.

ATF is starting a school that will train those with a position in the field in the basics. The idea is to take new people in the field and give them a common base to supplement what they can obtain in their own lab's training program. This, however, is not complete training and requires that you are in a position with a lab that will assure ATF that you are being fully trained. It is my understanding that much of the material for this was developed by Jack Dillon. Mr. Dillon prepared the material that was (is) taught at the FBI academy "Gunshot and Primer Residue" class which is an excellent program that bodes well for the ATF program.

The International Association for Wound Ballistics (IWBA) is also a good group to affiliate with. Their journal (semiannually) provides good information in that area of study and though not annual, their meetings are well worth the trouble of attending as well. The contact address is IWBA PO Box 701, El Segundo, CA 90245.

Many labs have good training programs but these are also for their own people. For reading on your own, you might want to start with some of the basic books in the field, for example get a copy of the AFTE Glossary and look through it. Consider some of the following books for your free time (which as a student I had little of as class material took up most): "Firearms Investigation, Identification and Evidence," by Hatcher, Jury & Weller, "Toolmarks, Firearms and The Striagraph," by Davis, "The Identification of Firearms and Forensic Ballistics," by Burrard, "Handbook of Firearms and Ballistics," by Heard (written for a lay audience), and Gunther & Gunther's "Identification of Firearms." Those will give you both the basics of the field and its development history.

The finding of these titles, if not the reading as some have been out of print for decades, will keep you busy for some time. "Hatcher's Notebook," by Hatcher on general firearms subjects provides some good basic information. If you want to go into the aspects of wound ballistics, Lagarde's "Gunshot Injuries" and DiMaio's "Gunshot Wounds" (second edition is just out) would be a place to start.

Probably any training program you go through will have you read all of these and many others. This is just a starting point if you want to get into basics and history. There are a lot of good books on firearms in general and you might want to start with Ezell's books (He was a former curator at the Smithsonian.) On exterior ballistics the material in the Sierra reloading manual (and Lyman, too, if I recall) by Dr. W. McDonald is very good.

Read all you can about firearms but keep in mind that not all is accurate (much in the popular magazines is poor).

A few interesting links to check out:
www.IWBA.com or try **www.afte.org/**

—Jim Roberts
Firearm and Toolmark Examiner
Ventura Co. Sheriff's Crime Lab

Financial Report
General Association Account
Account Balances, July 1, 1999 to September 30, 1999

Cash Balance July 1,1999		$68,898.25
INCOME		
Interest - Money Market	$340.25	
Meetings	$-	
Seminars	$-	
Membership dues	$-	
Membership applications	$995.00	
Newsletter	$16.00	
Advertising	$699.95	
Endowment income	$-	
Seed $ Paid - Meeting South	$250.00	
Other	$318.00	
Total income	$2,619.20	$2,619.20
EXPENSES		
Travel	$577.00	
Printing	$-	
Postage	$250.32	
Supplies	$-	
Bank fees	$317.04	
Accounting service fees	$-	
Awards	$-	
Meetings	$-	
Seminars	$400.00	
ABC support	$790.18	
Memorial donations	$-	
Endowment Exp., admin.	$-	
Journal	$-	
Phone	$-	
Refunds	$32.95	
Newmember	$-	
Seed $ Loss - Sp Seminar '99	$2,000.00	
Other	$192.00	
Total Expenses	$4,559.49	$(4,559.49)
Cash Balance September 30, 1999		$66,957.96

Cash on hand 09/30/99	
Savings	$10,925.31
Checking	$11,782.65
Combined CD Values	$40,000.00
Seminar Checking	$2,000.00
Spring '99 Seed Money	$-
Fall '99 seminar	$500.00
Spring '00 seminar	NA
Fall '00 seminar	$1,500.00
Meeting South Seed	$250.00 Paid
	$66,957.96

Michelle JoAnne Fox
CAC-Treasuer

JOHN**SIMMS**

Quality Assured

Fight The Future

Yes, I ripped off the title of one of my favorite movies….and yes, I am a fan. But today, I invoke this phrase because I would like to have a conversation with you about the future. This is not a technical paper today, this is not a current update on things. This is a sit-back, put-your-feet-up-and-relax kind of conversation…. about the future. Before we go there, though, let's look at where we have been.

THE WAY WE WERE

Of course there were things that we were doing before accreditation that could be called quality assurance but it was perhaps fragmented and not so systematic, not so formalized. Certainly the amount of documentation that we used to do was much less. In short, there was much more freedom then than we have now. But mind you, as you sit there and nod your head and reminisce about the good ol' days, this was not always a good thing.

We did not always write down all of what we did. Why would we want to do that and give the defense attorneys more ammunition against us? In many cases we knew our results were right and perhaps we did not fully document our standard. The instruments? Hey, we know they are working fine if the printouts look right. Proficiency tests? Well, if I can get to it, I will but I really have to get those cases out.

THAT WAS THEN, THIS IS NOW

Now we have manuals that document methods and we have approval systems for method changes. We actually have to validate a method before putting it on line. Proficiency tests are now formally tracked with possible remediation requirements for those answers that were close but not quite right. Everyone has to take them and we have to have historical records to prove we did what we say we did.

We document court testimony evaluation. We document training. We thoroughly document our casework down to the photos that are placed on pages and inserts, and yes, instead of getting out the next case, we have to sit there and put on those bits of info, like case number, date, initials, and page numbers.

The discussions were very organized, at a few times lively, and always productive and positive.

And we still cannot pull out the next case because now we have to send that report over to our colleague so they can technically review it. And that, too, had better be documented or it did not happen.

We had better fill out those reagent logs or it is as good as no reagent at all. Lot numbers, QC checks, dates, initials, if they are not there, then our casework results may be called into question.

We have to take someone from staff so that they can coordinate all these issues, so they can help fact find on glitches to the system, so they can walk into a unit of professionals, inspect them, look under the hood so to speak, and tell them how they are not in compliance or how they need to make changes to their process. And did this audit have any real affect on the results of their casework or did it just increase the paperwork?

We standardize report formats. We have policies on how to or how not to release verbal information. We have eliminated informal opinions for the most part. We have reduced our flow of casework in the interests of expanding the documentation for our casework and by expanding our web of policy requirements.

Yes, absolutely, you say, as you nod your head in both agreement and sigh in despair. And where are we to go with this? What does the future hold for us? You grow quiet with contemplation and perhaps fear the worst.

FIGHT THE FUTURE

There are certainly going to be those who will say we have ruined forensic science. There are those, however, that objectively compare what they were doing in the past and see what they are doing now, and realize that yes, in fact, we do have a better product. QA does not necessarily mean better results, although in some cases it might, but it means better documentation so the work we have done can be completely and thoroughly reviewed. It means that if necessary, the work we have done can be completely reconstructed based on documented methods and annotated notes. It means that we can evaluate the quality of the analyst based on court testimony review and proficiency test records. Yes, the court system has a right to know all that information to objectively evaluate the overall quality and reliability of the

work that was done. *People's lives and livelihoods depend on what we do. We had better do the best damned job we can do and provide the best damn quality product we can provide.*

Yes, I am a quality assurance manager and I believe wholeheartedly in what I do. But I also realize that we are treading on thin ice. I hear the daily grumblings of scientists who are frustrated with so many new requirements. When the grumbling comes from highly professional scientists with modern viewpoints, we really need to take stock of what we are doing and ask where are we going and for what purpose?

I have a tremendous advantage of being closely networked with other quality assurance managers and can see developing trends. Here are a few that all look very favorable, even for those frustrated scientists who fear the growing detailed policy and regulation:

Cutting Back on Unnecessary Policy

Many laboratories initially killed themselves with overreacting to accreditation inspections and developed detailed layer upon layer of policy and regulation. It was not necessarily ASCLD/LAB telling us to do this, but rather it was the way the laboratories were choosing to respond to the standards. Yes, in some instances, you will find inspectors taking extreme interpretations of the standards but remember that there is a system of checks and balances. The board can hear the lab director's case and will overrule the inspection team if it can be shown that what the lab is doing is reasonable.

Now, with the over-self-regulation that has occurred, we find laboratories starting to cut back on the excess policy fat. If it is not necessary, don't do it, don't require it, don't monitor it. QA will continue to increase its sensitivity to the current criticisms and be very aware and be very careful not to push things too far.

The Face of Inspections Will Change

ASCLD/LAB will be restructuring the inspection process and using paid team captains, or lead inspectors, which will go a long way in establishing better consistency in application of the standards to labs whether they be in California or Florida or Australia.

The face of inspections has already changed just a bit….and in a very interesting way. In one recent re-inspection, a highly unreasonable demand was being placed on the lab with regards to marking evidence. The QA manager hit the internet and contacted our QA network to find out what our industry standard was. It was clear and unequivocal that the inspector was way out in left field on this and the feedback from our network went immediately back to the team captain. The captain changed their ruling on this issue. Who knows, there may be more of this kind of immediate response during future inspections as the QA network will certainly continue to grow.

Growing Importance for the Judicial System

Eventually, our court system will be making regular, heavy demands on the QA systems of the laboratories in terms of records and documentation. We have only hit the tip of the iceberg on this so far. But as awareness and understanding of what QA is all about spreads through the system, and what it means in terms of available documentation, requests to provide those records will increase.

Getting Back to Our Roots of Forensic Science

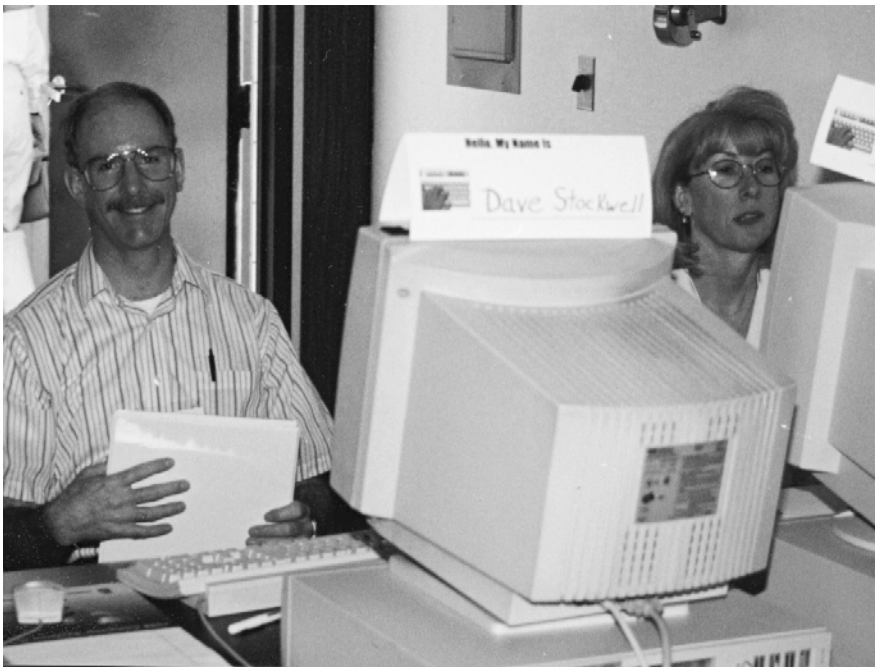
Related to the process of cutting back on the excess policy fat, is my belief that we will reestablish the strength of the independent thought and analysis of the forensic scientist. We will help reestablish the rule of fairness and common sense. There is plenty of room for both good quality assurance and the exercise of good scientific judgment and common sense. *We had better find ways to accommodate both or QA will suffer a serious backlash.*

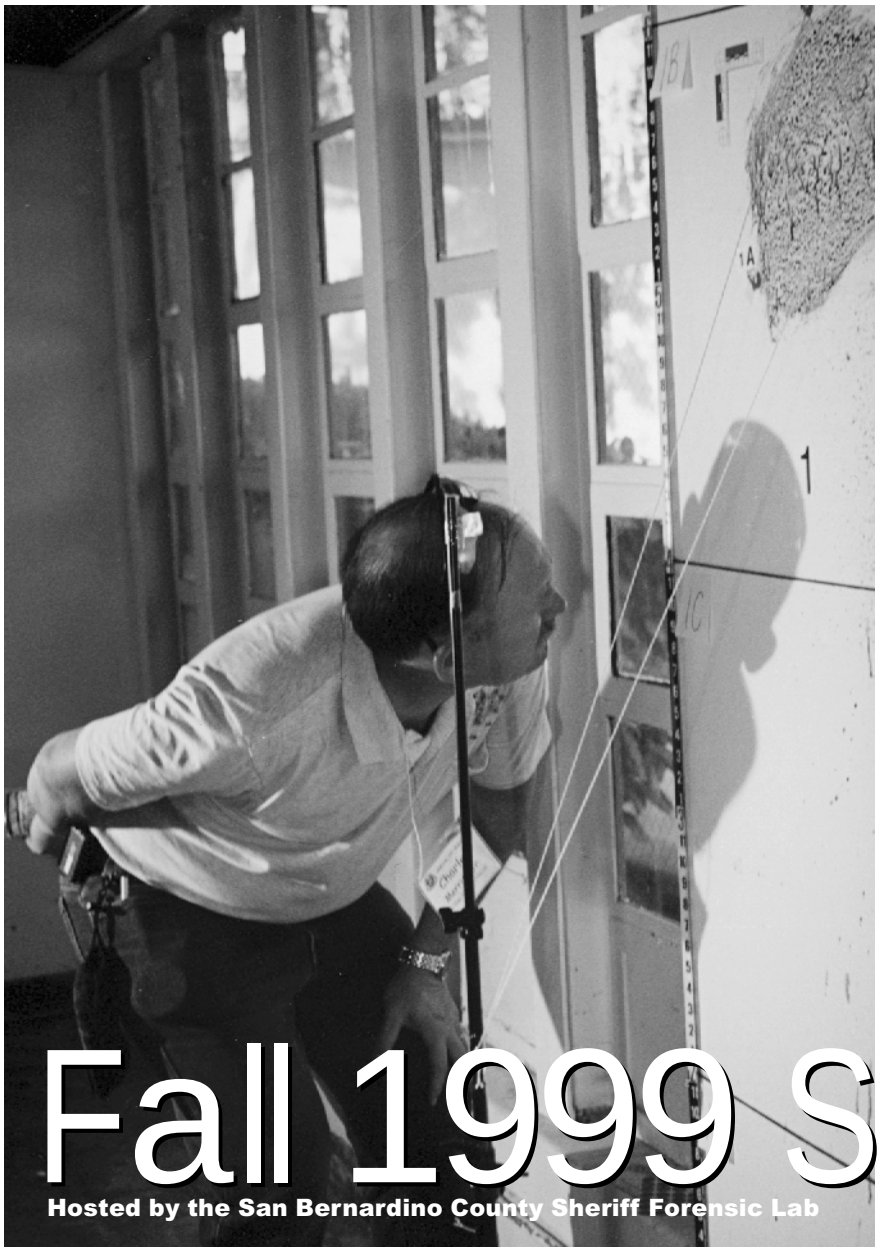
It is not "fight the future"…it is fight the present and embrace the future

By now, I hope you realize I am using the title with a sense of irony. We have pushed the policy envelope and it is time for us to start pulling back to some extent. We have started to do that and we need to do it more. We will not threaten our work product if we cut back with intelligence and find simpler ways to meet accreditation standards. Quality assurance is not an easy job for anyone, either for the QA managers or for the scientists on the bench. But the key to success is teamwork and to remember that Quality Assurance is a support function.

You will find the following experience in any laboratory: Some of our scientists have been on the witness stand for old cases and had to deal with the old style case packets (sparse notes and little other documentation); they absolutely dreaded every moment of it. When they are on the stand and deal with the new well-documented case packets, these same scientists find it much easier and are more relaxed on the stand.

Just for clarification, I exaggerated a bit on where we were, I spoke somewhat facetiously on where we are at today, but I urge caution with where we are going tomorrow. I also offer this advice: **Let's temper where we are going with common sense. We can do this without lowering our standards of quality.**





Fall 1999 Seminar

Hosted by the San Bernardino County Sheriff Forensic Lab

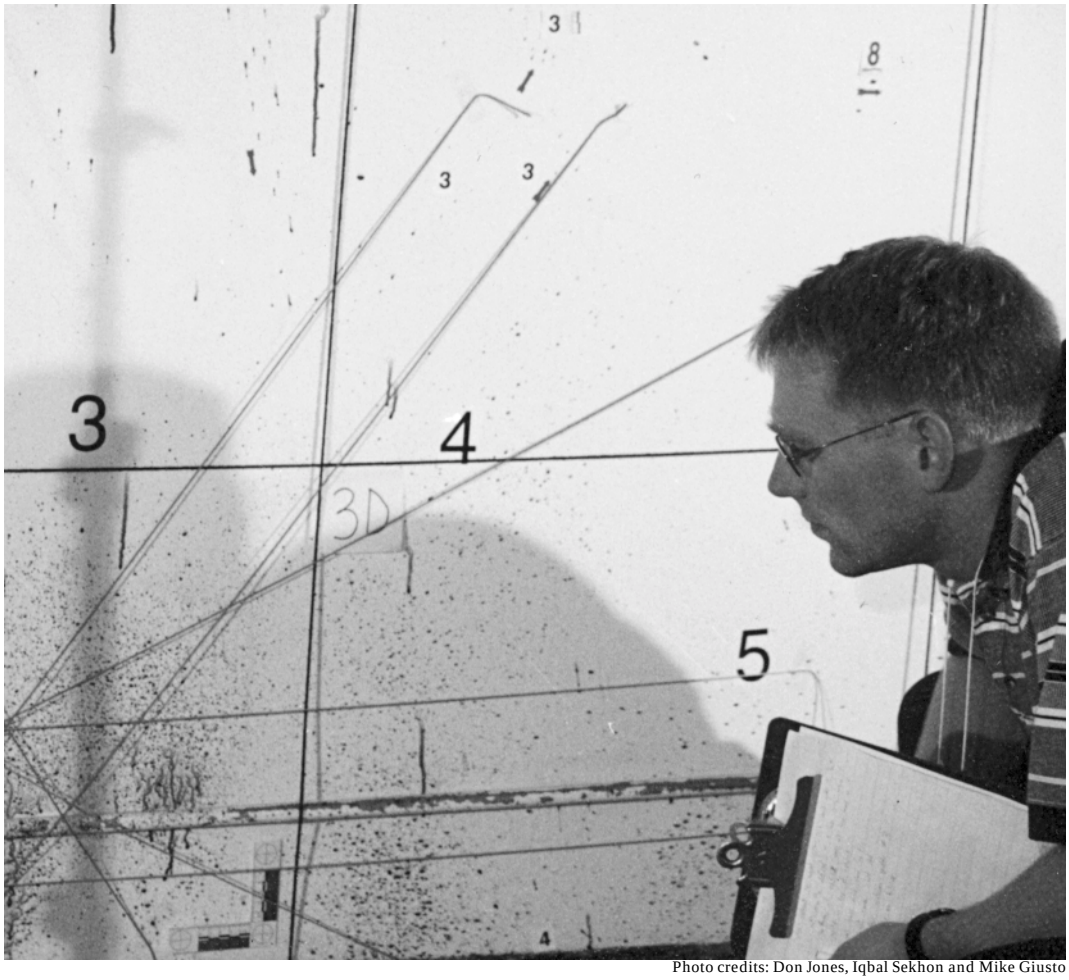


Photo credits: Don Jones, Iqbal Sekhon and Mike Giusto

B O A R D O F D I R E C T O R S

California Association of Criminalists

Next quarter in The CACNews

Chesterene Cwiklik explains blended fibers, and a fascinating online discussion of "What is a criminalist?"

Interested in becoming a member?

— Receive the *Journal of the Forensic Science Society* and/or *Journal of Forensic Sciences*—
— Receive *The CAC News* —
— Lower, Member registration fees at CAC Seminars —
— Receive CAC Membership Roster / Seminar Abstracts —
— Receive Salary Survey of Government Labs —
— Membership in a prestigious Forensic Society —

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

Hertzberg-Polanco Crime Laboratories Construction Bond Act

Article I, Section 14, By-laws of the CAC: *When appropriate, to review and act upon any pending legislation which appears to be related to the field of criminalistics.*

The Hertzberg-Polanco Crime Laboratories Construction Bond Act of 1999 will appear on the March 7, 2000 ballot as Proposition 115. It will authorize the issuance and sale of $ 220 million of general obligation bonds to pay for building of new local forensic science laboratories and to upgrade and repair existing local laboratories. The legislation establishes a Forensic Laboratories Authority (FLA) consisting of Attorney General, the "State Director of Crime Laboratories" and five other members, gubernatorially appointed for staggered 3-year terms. The authority reviews applications for financing of working drawings, preliminary plans, construction, renovation, and equipping of laboratories and parking facilities and other improvements directly related thereto. Applicants must provide 10 percent in matching funds and agree to pay ongoing operating costs of the laboratory.

The thrust of the arguments in favor of Proposition 115 should be familiar to anyone who has been in a local forensic science laboratory:

—Laboratories are overcrowded.
—Crime lab backlogs delay trials and that costs taxpayers money.
—Delays can result in the release of murders, rapists, and other violent criminals.
—Fewer innocent people will be charged with crimes through the improved analysis of evidence.
—Forensic science evidence is essential in prosecution of THE majority of murder, rape, drug and arson crimes.
—FLA is an independent authority.
—Support comes from law enforcement, firefighters, crime victims, and labor.

The arguments against Proposition 115 point out that:

—State funds should be used for forensic labs to "help police officers and prosecutors prove their cases with physical evidence,"
—This could be done through privatization, and
—Bonds aren't cost effective ways of doing business.

It is encouraging that despite their opposition to the way in which Proposition 115 proposes to fund forensic science laboratory improvements, even the opponents place value on the work we all do. Both the recent experience in the UK and the volume of work we do would argue against the idea that what public forensic scientists do can be done readily through privatization. In a better world, state and local governments would adequately fund forensic laboratories, planning for replacement, expansion, and upgrading of facilities and equipment. In that world, a dependable funding source would be established and the suppliers of forensic science services would formulaically expand as the number of law enforcement officers grows. In that world the defense bar would endorse forensic science laboratory projects as being in the interests of their clients, too.

In the meantime, those of us in local forensic science laboratories will think ourselves fortunate to have a bond issue to provide new or renovated facilities and we will wish similar fortune upon our state colleagues. There can be no recent legislation with the potential for more positive impact upon the forensic sciences in California. Whatever its imperfections, I strongly encourage your support of Proposition 115.

—Hiram Evans

By permission of Tony Cochran and Creators Syndicate.

Face Game Answers: Top *(l-r)* Vincent Raspail, Masao Takayama, Paul Uhlenhuth, bottom *(l-r)* Alphonse Bertillon,Karl Landsteiner, Prof. Wood (Lizzie Borden trial).