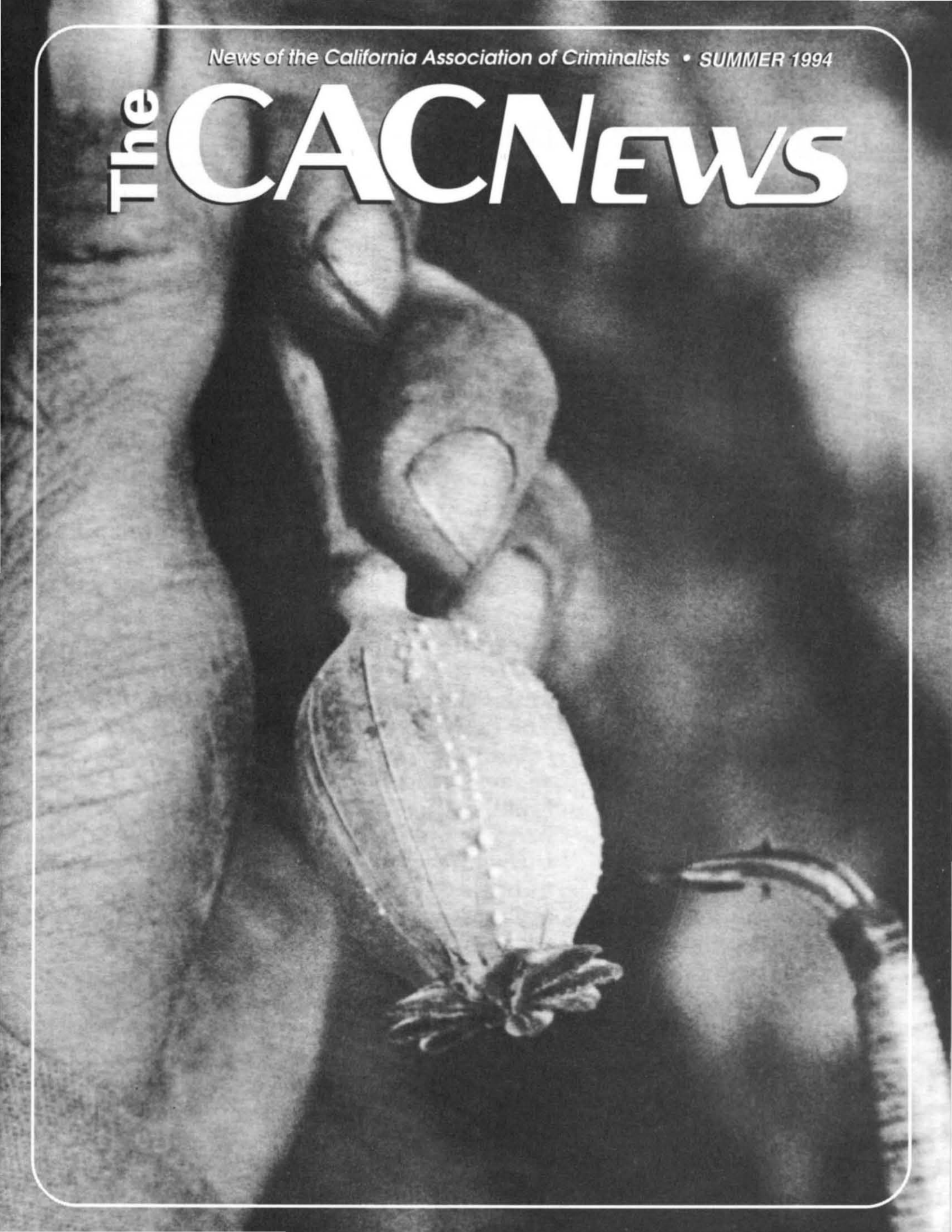
News of the California Association of Criminalists • SUMMER 1994

The CAC News



The President's Desk

Twenty years ago I heard of the California Association of Criminalists for the first time. I was a fledgling criminalistics student in one of John Thornton's criminalistics classes at UC Berkeley. John encouraged all his students to become student affiliates and to be as active as possible. His pride in the accomplishments of this organization was patent, and as time went by, the reason for it became clear to me. Here was an organization that did not sit back and wait for others to act. It moved ahead. It made things happen.

The CAC developed the first Code of Ethics for any forensic science organization in the country. Our code has provided the basis for every forensic science code of ethics or professional conduct that has come along since. The CAC was not content with simply giving testimonials to matters of professional conduct. On the contrary, it developed a procedure to enforce the code. It remains the only forensic science group to have done so.

In 1989, after several years in development, the CAC launched the first criminalistics certification program in the world. We have awarded certification to 134 people to date. Our program sparked a national interest and served as the model for the American Board of Criminalistics certification program. Our general knowledge examination was adopted, with few modifications, by the ABC as a part of the requirements for certification. We are now developing a specialty certification examination in forensic firearms identification —another first.

Through the generosity of A. Reed and Virginia McLaughlin Endowment Fund, the association has been able to more actively support the professional growth of its members. The generous gift of the McLaughlin's is testimony to the regard in which Reed McLaughlin held the association. The Endowment Fund has supported independent research, scholarships for criminalistics students and training for our members in a variety of subject areas.

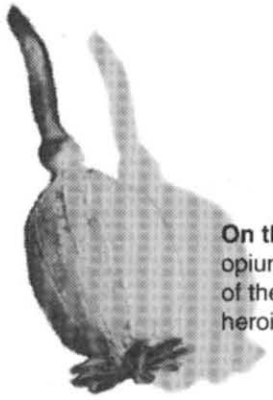
Throughout, CAC seminars, study groups and dinner meetings have been a forum for the presentations of notable scientific research, exchange of technical information and development of lifelong professional associations and dear friendships.

There is so much here. Share the secret with your colleagues the John Thornton shared with his students. Let them know about the benefits of membership. And remember, the many "firsts" the CAC has achieved happened because of the individual and collective work of its members. That's how ***you*** make things happen.

The CACNews is published four times a year (January, April, July, and October) by the California Association of Criminalists, a non-profit professional society dedicated to the furtherance of forensic science in both the public and private sectors.

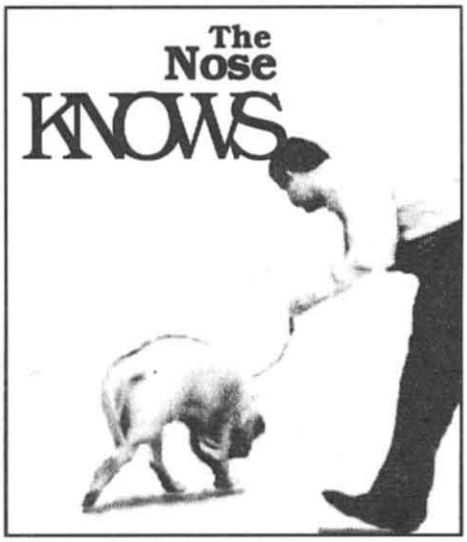
The CAC News

Summer 1994



On the cover: A worker scores an opium poppy to gather its "milk" in one of the first steps in the production of heroin. Photo by Michael Renard .

Sandy scopes out the Spring Seminar—more photos beginning on page 12.



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Departments

Features

Technical Papers

Recreations

Notice to Contributors

This newsletter publishes material of interest to its readers and is pleased to receive manuscripts from potential authors. Meeting announcements, employment opportunities, course announcements, etc. are also solicited. Advertisements are also accepted, although a fee is charged for their inclusion in The CAC News. Please contact the Advertising Editor for further information. Because of the computerized typesetting employed in The CAC News, the Editorial Secretary requests that where possible, submissions to the News be made in the form of IBM or MS-DOS compatible files on 5.25 or 3.5 inch floppy disks (high or low density). It is preferred that text files from word processors be saved as ASCII files without formatting codes, e.g. bold, italic, etc. An accompanying hardcopy of the file may be submitted along with the disk to illustrate the author's preference for special emphasis. Graphics, sketches, photographs, etc. may also be placed into articles. Please contact the Editorial Secretary for details. FAX submissions are also acceptable. The FAX number for the Editorial Secretary is (408) 298-7501. The deadlines for submissions to The CAC News are: December 15, March 15, June 15 and September 15.

CACNews Goes Big Time

We Have A New Look!

On behalf of the CAC Board of Directors, the staff of the CACNews is proud to announce that, starting with the Fall issue, we are officially an "Editorial Review" journal. Original technical articles appearing in the CACNews will now be reviewed and approved by an associate editor of the journal.

Much like Walter McCrone's *Microscope*, the CACNews will still eagerly solicit technical articles of interest to its members in all aspects of forensic science, but instead of automatically publishing them, an editor will work with an author to "polish" the work before publication. Although not as rigorous as a fully "peer review" journal, it is our hope that the new plan will result in continued high-quality articles appearing in these pages, adding a certain element of prestige and credibility to the work.

If you or someone you know has been "sitting" on a paper of interest—new methods, history of forensic science, profile of outstanding scientist, or even an interesting case, please consider sending it into one of the editors now. If you've always cried, "But I can't write!", our staff will be happy to work with you to get your good ideas into a publishable form.

CAC Northern Section Computer Study Group

Whether you are a highly developed computer nerd, or completely technophobic, the CAC Computer Study Group (Northern Section) is for you. We will focus on the application of computers in

forensic science practice and laboratories, and will provide an opportunity to share information and learn about available hardware and software. We have tentatively scheduled the meetings for the fourth Wednesday of odd-numbered months. The first several meetings planned include July 27, "Digital and Analog Image Capturing and Storage" (Steve Shaffer), Sept. 28, "Digital Image Processing" (Dwayne Dillon), and Nov. 23, "Photo CD" (Chuck Morton). If you cannot attend, but are interested in remaining on the mailing list for future meetings, please call, FAX, or E-Mail Peter Barnett. Include your FAX number or E-Mail address with your preference of how you would like to receive meeting announcements.

Peter Barnett can be reached at (510) 222-8883 (voice); (510) 222-8887 (FAX); E-Mail: 71267.1463@compuserve.com

Have you always wanted to be an

Inkstained Wretch?

- The CAC News is seeking two Technical Editors to serve on the recently formed PUBLICATIONS COMMITTEE.
- Successful applicants will be able to read and write English, have reasonably good grammar skills, and most importantly, be able to meet a deadline.
- If you've always wanted to shout GREAT CAESAR'S GHOST! as well as solict and edit technical articles for upcoming issues, please contact the Editorial Secretary right away. The philosophy of the technical editorial staff is expected to be one of encouraging authors to submit good papers to the CACNews, not to reject poorly written ones, but rather working with authors to refine papers for publication.
- Benefits include working with a great, motivated group of CAC members, and having considerable control over the content of the CACNews (Rumor has it that there may be some CAC sponsored travel to the occasional committee meeting.)

John Dehaan Earns 1994 CAC Distinguished Member Award

The Awards Committee is pleased to announce that John DeHaan was the recipient of the 1994 Distinguished Member Award at the Spring Seminar in Oakland.

A native of Chicago, John earned his B.S. degree in Physics, with a minor in Criminalistics, from the U. of Illinois in 1969. He entered the field of Criminalistics the following year when he came on board with the Alameda Co. Sheriff's Dept., where his efforts were focused in the areas of trace evidence, firearms examination and photography. In 1974, John went to work for the California Dept. of Justice, in their Sacramento laboratory, where he spent the next nine years working in the areas of arson, explosives, trace evidence and impression evidence. He went to work for the federal government in 1983 when he joined the U.S. Treasury Dept.'s San Francisco lab, concentrating on explosive devices and arson. In 1987, John became a Program Manager and instructor at the California Criminalistics Institute, where his work continues today.

Throughout his career, John has been a prolific author and speaker. He is widely published in a variety of journals, has authored the second and third editions of Kirk's Fire Investigation, and has given presentations, lectures and classes all over the world. Indeed, John has been quite active on the international scene, particularly with the Forensic Science Society, where he is the only Diplomate in Fire Science.

During his twenty-three years with the CAC, John has been an extremely active and contributing member, and has served in many capacities, including President, Secretary, Northern Regional Director, member of the Certification Committee, and founder and chair of the Merchandising Committee.

As a Criminalist, author, researcher and teacher, John exemplifies the best of our profession. His depth of knowledge, diversity of interests, energy and wit have been an inspiration many of us in the Association. The Awards Committee congratulates John DeHann on receiving this most deserved award.

MailBag

Bloody Mess

To the Editor:

Recently I have been made aware of an article in the *Journal of Forensic Identification* which causes some concern.[1] The article, titled "Bloodstain Pattern Identification Subcommittee Annual Report," appears in Volume 44, No. 2, pp 209-214. The article addresses the accomplishments of the International Association for Identification's Bloodstain Pattern Identification Subcommittee. The subcommittee has proposed a recommended vocabulary and statement of purpose to the Board of Directors of the IAI. Apparently, the subcommittee plans to continue beyond terminology and into "minimum standards of training" and possibly certification.

The article's purpose is to define a common vocabulary for its multi-disciplined crime scene personnel. It is stated that this "compilation of phrases and definitions [is] used currently by practitioners and professional organizations." I, along with other criminalists, feel these "phrases and definitions" conflict with such definitions already set forth by others working in this field.[2-6] Criminalists in the CAC should be made aware of the article, for someday it may be encountered in their work or testimony. I recommend those involved in bloodspatter issues to read the document.

I have drafted a letter which has addressed the concerns of others and myself. The letter has been sent to the *J. Forensic Ident.* and forwarded to the IAI Board of Directors and the CAC Board of Directors. If anyone is interested in our comments, please contact me.

I would encourage those who have read the article and formed an opinion to write to the Editorial Board of the *J. Forensic Ident.* and express that opinion. After all, it is peer review that gives a strong foundation to progress in science.

Dean M. Gialamas
Tustin

REFERENCES

1. Ostermeyer, D. "Bloodstain Pattern Identification Subcommittee Annual Report", *Journal of Forensic Identification*, Vol. 44, No. 2, 1994, pp. 209-214.
2. MacDonnell, H.L. and Bialousz, L.F., *Flight Characteristics and Stain Patterns of Human Blood*, U.S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice, U.S. Government Printing Office, 1971.
3. Laber, T.L., and Epstein, B. P., *Experiments and Practical Exercises in Bloodstain Pattern Analysis*, Midwestern Association of Forensic Scientists, Callan Publishing Inc., Minneapolis, MN, 1983.
4. International Association of Bloodstain Pattern Analysts, Terminology Committee, List of Terms, Corning, NY, 1985.
5. Eckert, W.G. and James, S.H., *Interpretation of Bloodstain Evidence at Crime Scenes*, Elsevier Science Publishing, New York, NY, 1989.
6. California Criminalistics Institute, *Forensic Bloodstain Pattern Interpretation* Course Workbook, California Department of Justice, 1993.

Just Say "No" to ABC

To the Editor:

"Given Adequate Tools and Training, the Collective Integrity of Individual Employees Will Ultimately Result in Product Integrity."

Above is the first sentence in a brochure from an instrument company. Although referring to the integrity of products produced by a commercial business, the same philosophy applies to the work product integrity of a forensic laboratory . The first phrase is especially significant. A forensic laboratory must first provide its employees with "adequate tools and training." Only then may an individual employee be held accountable when product integrity is unsatisfactory.

Let's apply this to the question of forensic laboratory certification versus individual examiner certification. If for a forensic lab to be certified to perform examinations in specific areas it must initially meet and periodically thereafter show the it continues to meet certain minimum standards in terms of instrumentation, employee background, training, proficiency testing, safety, etc., then the onus will be on the lab administrators as well as those involved in funding decisions higher up the chain of command. In other words, if you want the forensic lab to provide certain services you must be willing to budget for all the costs necessary to maintaining laboratory certification in those areas.

Suppose instead the emphasis is on individual examiner certification. Now the onus is on *you*, the individual employee. But what real leverage do you have? If you tell your superiors that to do the examination properly you require additional instrumentation and training, the answer may well be, "Yes, I agree with you, but this is a real tight budget year. I'm afraid you'll have to make do with existing instrumentation and obtain training on your own." And when you then fail on a proficiency sample, of course your superiors will readily admit that they are at least partially responsible because they failed to provide you with the necessary instrumentation and training —NOT!

I strongly urge my fellow CAC members not to support the ABC program on individual certification as it is presently structured. Individual certification must be a part of laboratory certification. All costs and paperwork associated with individual certification should be provided by the laboratory. This should be one of the requirements a laboratory (not the individual) must meet in order to obtain and maintain certification to perform examinations in specific areas such as: latent prints, firearms and toolmarks, footwear and tire tracks, drugs, toxicology, questioned documents, trace evidence, arson, serology, DNA profiling, etc.

—Robert D. Blackledge
San Diego

Just Say "Yes" to JFSS

To the Editor:

I recently had a phone call from a colleague on the East Coast who needed a copy of a citation from the Journal of the Forensic Science Society. I was glad to oblige and fax a copy but I was puzzled as to why the request was being made, since it came from a major laboratory. Surely, the lab had access to the Journal. It turns out that due to budget restrictions, the lab's subscription had been suspended. I was about to ask why a copy from the local forensic science society membership wasn't available

Please turn to Page 22

First CAC Computer Study Group Reports In

The first Computer Study Group meeting was held at Forensic Science Associates on May 25, 1994. The topic for the meeting was on-line communications, computer bulletin boards, the Internet, and the CAC Forum. 14.4 baud FAX/modems, which are available for $100, enable anyone with a personal computer to access a tremendous variety of computer resources.

Ed Miller demonstrated how to connect to computer bulletin boards and how to use public domain software (BlueWave) to download on-line discussions. Ed passed around lists of computer bulletin boards, the yellow pages for the Internet, in which a wide variety of material is listed. He also demonstrated the use of BlueWave to download on-line discussions from FidoNet bulletin boards.

Ed demonstrated how to call CompuServe and America Online. Both of these commercial computer services have a wide variety of information available and also offer access to various features of the Internet, especially the Internet mail facility.

Information about the CAC Forum was also distributed. The CAC Forum is an Internet mail forum. This forum allows any subscriber to send a message to the forum and that message is automatically forwarded to all of the forum subscribers. Anyone can subscribe to the CAC forum by sending a message to

listserv@netcom.com

The message should consist of a single line which reads

subscribe CAC-forum <your_e-mail_address>

The CAC Forum administrator is **Ron Moore** of the Orange County Sheriff's laboratory. Ron's e-mail address is

kd6lff@netcom.com.

Reminder: The next meeting will be July 27 at Forensic Analytical in Hayward. **Steve Shaffer** will host the meeting and the subject will be image capture and manipulation.

Following is a list of people who attended the meeting, and others who have expressed an interest in the meeting. E-mail, or FAX, addresses are also listed for those who have one or the other. Anyone who is not on this list and would like to receive notices of the meetings, should contact **Pete Barnett** at FAX:510-222-8887 or E-mail:

71267.1463@compuserve.com

All meeting notices are sent by FAX or E-mail.

Peter Barnett	71267.1463@compuserve.com
Jennifer Mihalovich	510-222-8887
Paul Holes	510-313-2840
Linda Wraxall	
Terry Coddington	
Stephen Shaffer	72436.3407@compuserve.com
Duayne Dillon	
Chuck Morton	510-451-0839
Jerry Chisum	HBNT22A@prodigy.com
Terry Fickies	916-227-3776
Steve Bryant	70724.3526@compuserve.com
Brian Wraxall	510-222-8887
Ed Miller	70446.1270@compuserve.com
Rob Stoinoff	209-948-7714
Roger Ely	415-744-7055
Mao-Sheng Ma	510-540-2701
Jerry Masetti	209-278-7731
Norma Hill	510-486-3166
Jim Norris	72103.3711@compuserve.com
Ben Smith	72240.2101@compuserve.com
Ferdinand Rios	76210.702@compuserve.com
Marcy Wolleson	73142.1341@compuserve.com
Alexander Shulgin	shura@netcom.com

(The CACNews can be reached at 70642.773@compuserve.com but we are not yet a subscriber to the CAC Forum—Ed.)

Position Available

Forensic Scientist I

The Palm Beach Sheriff's Office Crime Laboratory currently has an opening for Forensic Scientist I, (Serology/DNA). Minimum qualifications include a Bachelor's degree in Biology, Chemistry, Forensic Science or a closely related field plus two years of crime laboratory experience. Duties include analysis of biological materials and testimony in a full range of casework applications. Candidates are subject to background investigation and post-job offer processing includes polygraph, physical and drug screening. Salary range: $26,424 - $41,112. Submit resumes to: **Joan Cockerham**, Personnel Director, Palm Beach Sheriff's Office, 3228 Gun Club Road, West Palm Beach, FL 33406. Direct inquires to: Barbara Caraballo, Serology Supervisor (407) 688-4233. ***EOE/ADA***

Criminalist II/III

The Santa Clara County District Attorney's Crime Laboratory is seeking applicants for a Criminalist II/III position. Minimum qualifications include an appropriate Bachelor's degree and two years (Criminalist II)/four years (Criminalist III) work experience. Monthly effective salary is $3521-4266 (Criminalist II)/$4066-4923 (Criminalist III). For further information, contact Benny Del Re, Santa Clara County Crime Laboratory, 1557 Berger Drive, Room B-2, San Jose, CA 95112, (408) 299-2220.

Document Examiner

The Las Vegas Metropolitan Police Department is accepting applications for the position of Document Examiner. Applications will be accepted until a sufficient number of qualified applications are received. The minimum qualifications include a Bachelor's degree in criminalistics, forensic science, chemistry, biology or a related field AND three years of professional research and practical experience as a questioned document examiner in a forensic lab. The annual salary range is $41,219 to $54,242. (Compensation level is currently under review and adjustments may be made to the pay range at a later date.) The Department offers an excellent employee benefit plan including 100% employer paid retirement, employee health, vision and dental care insurance, 3 weeks of paid vacation per year and 13 recognized holidays per year. Additionally, there is no Nevada State income tax. Interested candidates may request an application by contacting: Las Vegas Metropolitan Police Department, Personnel Bureau, 400 E. Stewart, Las Vegas, NV 89101, (702) 229-3497. Inquires regarding the position may be directed to Linda Errichetto, Forensic Lab Director, (702) 229-3497.

Forensic Scientist 3

The Washington State Patrol Crime Laboratory Division is seeking experi-

enced applicants to fill a firearms and toolmarks examiner position within the division. Minimum requirements are a bachelor of science degree in forensic science or a natural science which includes 20 semester (30 quarter) hours of chemistry and 5 semester (8 quarter) hours of physics, plus three years of full-time, paid technical experience in a forensic laboratory, which includes testifying as an expert in courts of law. Five years of experience performing independent complex casework in firearms/toolmarks will suffice in lieu of the bachelor of science degree. Annual salary: $36,132 - $45,096. for further information, please contact: **Capt. Robert Leichner**, Wash. State Patrol, Crime Laboratory Division, PO Box 42632, 621 Woodland Sq. Loop, Lacey, WA 98504-2632.

Meetings

Southwestern Association of Forensic Scientists

November 15-19, 1994

SWAFS will be holding its Fall 1994 training seminar at the Adam's Mark Hotel in Houston, Texas. Proposed workshops include explosives, SEM/EDX, microcrystalline drug identification, stress management, PCR, Intoxilyzer repair, basic firearms identification, pyrolyis GCMS of polymers, LCMS identification of drugs, FTIR analysis of fibers, advanced photography, ELISA, and mass spectral identification. For more information contact **Pauline Louie**, Houston Police Department Crime Laboratory, 33 Artesian, Room 326, Houston, TX, 77002-1505. (713)247-5449.

California Association of Criminalists

Oct. 19-22, 1994

The 84th Semi-Annual meeting of the CAC will be held as a joint meeting with the Forensic Science Society at the Pasadena Holiday Inn. Co-hosts for the meeting are the Los Angeles Coroner and Los Angeles Sheriff's laboratories. Featured events include a workshop on the design of crime laboratories; papers and discussions will include Fingerprint I.D., DNA, and Mass Disasters such as the Lockerbie crash and the Waco, Texas incident.

For more information, please contact **Manuel Munoz** at the LA Co. Sheriff, 2020 W. Beverly Blvd., Los Angeles, CA 90057, (213) 974-7086.

California Association of Criminalists

May 10-13, 1995

The 85th Semi-Annual meeting of the CAC will be held at the Walnut Creek Mariott located in Walnut Creek, California, on May 10-13, 1995. Walnut Creek features exceptional restaurants, shopping and a Regional Arts Center within walking distance of the hotel. Room rates are excellent at $68 single or double.

Tentative workshops include an Armorer's and Preventative Maintenance Course by Glock and a Polaroid Photography class emphasizing film types and laboratory photography. A Western Regional Laboratories DNA Workshop is also planned.

Technical papers will be held on Thursday, Friday morning, and Saturday morning. The American Board of Criminalists (ABC) General Knowledge Exam will be offered on Saturday. For further information contact **Karen Sheldon**, Contra Costa County, Sheriff's-Coroner's Dept., 1122 Escobar Street, Martinez, CA 94553, (510) 646-2455.

Future Seminar Sites

The next CAC Semi-Annual seminar sites have been announced by **Tina Chan**, Chair of the Seminar Committee:

FALL 1995: Sheraton Los Angeles Harbor Hotel. Hosted by the Los Angeles Police Dept. Lab. Contact **Joe Hourigan** for info.

SPRING 1996: Hosted by Santa Clara County Crime Lab. No further info as yet.

FALL 1996: Hosted by the Calif. Dept of Justice Lab in Riverside. No further info as yet.

SPRING 1996: Hosted by the Sacramento County DA's Lab. No further info as yet.

Clandestine Laboratory Investigating Chemists

September 7 - 10, 1994

The 4th Annual Technical Training Seminar will be held at the Westin Bayshore Hotel in Vancouver, B.C. The annual CLIC seminars have become widely known for their highly specialized training programs on topics related to clandestine lab investigations, chemistry, analytical techniques and safety programs. Binders containing handout materials from the presentations will be included with the price of registration. For further information, please contact: **Richard Laing**, Health Protection Branch, 3155 Willingdon Green, Burnaby, BC V5G 4P2, (604) 666-8284.

The International Association of Bloodstain Pattern Analysts (IABPA)

October 6 - 8, 1994

The 11th Annual Training Conference of the IABPA will be held at the Newport Pier Beachside, Holiday Inn Crowne Plaza Resort in North Miami Beach, FL. For further information, please contact: **Toby L. Wolson**, Metro-Dade Police Department, Crime Laboratory Bureau, Biology/Serology Section, 9105 N.W. 25th Street, Miami, FL 33172, (305) 471-2052.

Notheastern Association of Forensic Scientists

October 13 - 15, 1994

The 20th Annual Meeting of NEAFS will be held in New York City at the East Side Marriott Hotel (212-755-4000). For further information, please contact: **Jeffrey H. Luber**, Suffolk County Crime Lab, Suffolk County Office Building #487, Hauppauge, NY 11787, (516) 853-5585.

Canadian Society of Forensic Science / Northwest Association of Forensic Scientists

October 31 - November 5, 1994

The CSFS and NWAFS will hold a joint meeting at the Waterfront Hotel in Vancouver, BC. Workshops and original presentations will run from Oct. 31 through Nov. 5, 1994. For further information, please contact: **Jeffrey Caughlin**, RCMP Forensic Laboratory, 5201 Heather Street, Vancouver, BC V5Z 3L7, (604) 264-3507.

Note: A GSR (gun shot residue) symposium/roundtable discussion will be held at this meeting. We are soliciting unpublished research which will be bound and distributed at the meeting. Also, we need suggestions for discussion topics and/or problems for the roundtable discussion. Please contact **Frank Boshears** (206) 593-2006.

International Assoc. of Forensic Toxicologists and Society of

Forensic Toxicologists Joint Congress

October 31 - November 4, 1994

For further information, please contact: TIAFT-SOFT 1994, c/o Medical Examiner Department, 401 South Morgen Street, Tampa, FL 33602.

International Congress on Forensic (TIAFT) and Environmental Toxicology (GRETOX 1995)

May 20 - 24, 1995

For further information, please contact: **Prof. Dr. An. Kovatsis**, Laboratory of Biochem-Toxicology, Aristotelian University of Thessaloniki, Greece 540 06, Tel. (031) 991-004.

Courses

CCI Course Schedule

Summer Quarter 1994
(July - September)

A102 **Survey of the Forensic Service** (DNA Lab) July 25-29

A103 **Courtroom Presentation of Evidence**
(Funded by US Customs)
August 9—11

A104 **Testimony Skills Workshop**
(BAR) July 19-20

A104 **Testimony Skill Workshop**
(BAR) August 17-18

B101 **Basic Serology** *(BFS Only)*
Revised Version July 11-15

B250 **DNA-PCR-DQA1**
August 29-September 2

C151 **Arson Accelerant Detection**
August 1-5

C201 **Clandestine Laboratory Analysis and Synthesis**
September

E102 **Firearms and Toolmarks - Introduction I**
June 27-July 1

E103 **Firearms and Toolmarks - Introduction II**
July 25-29

E151 **Latent Print Techniques**
September 12-16

E401 **Special Topics - Firearms**
September 27-29

M101 **Basic Practical Microscopy**
August 15-19

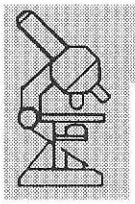
M203 **Microscopy of Rape Evidence**
September 20-22

S212 **Crime Scene Investigations II**
September

T103 **Basic Forensic Toxicology III**
August

T252 **Special Topics in Toxicology**
September

Contact CCI at (916) 227-3573 for further information



McCrone Course Offerings

Hayward

201:**Applied Polarized Light Microscopy**
Jan 30 - Feb 3, 1995

207A:***Microchemical Methods**
Oct31 - Nov 4, 1994

503:**Pharmaceutical Microscopy**
Jan 16 - 20, 1995

507:**Fiber Identification**
Jan 23 - 27, 1995

701:***Computers in Microscopy**
Feb 27 - Mar 3, 1995

(CAC Members Only)

TRAINING & RESOURCES VIDEO

SEROLOGY

Back to Basics Series:

TAPE 1:
- Electrophoresis Basics — *Ron Linhart*
- Glycogenated Vaginal Epithelia —*Ed Jones*
- Erythrocyte Acid Phosphatase — *Berni Rickard*
- Phosphoglucomutase —*J. White / M. Hong*
- Haptoglobin — *David Hong*

TAPE 2: · Immunology — *David Stockwell*
TAPE 3: · Gm / Km —*Stockwell / Wraxall*
TAPE 4: · Peptidase A — *Colin Yamauchi*
TAPE 5: · ABO —*Jeff Thompson*
TAPE 6: · Saliva —*Terry Spear* (incl DNA Kelly-Frye/Howard Decision)
TAPE 7: · Presumptive Tests/Human Determination—*Peterson/Mayo*
TAPE 8: · Gc—*Devine/Navette*

Also available:

Population Genetics & Statistics Course
Dr. Bruce Weir, Instructor
Eight two-hour tapes, PLUS the course notebook.
(from the three day course at SBSD)

Bloodspatter Lecture — Fall 1992 CAC Meeting
Gary Knowles, Instructor, 2 Tapes

Microscopic Exam. of Sex Assault Evidence
Ed Jones, Instructor

DNA Workshop — Spring 1993 CAC Meeting, 4 Tapes

GENERAL INTEREST

TAPE 1:
- ABC News 9/23/91: "Lab Errors"
- CBS News 4/27/92: "Animation Reconstruction"
- Alex Jason / Jim Mitchell: "Trial Animation"

TAPE 2: · 48 Hours 9/25/91: "Clues"

TRACE EVIDENCE

Basic Microscopy Lecture—*Ed Rhodes, Instructor*, Two tapes
Tire Impressions as Evidence—*Lawren Nause, RCMP, Instructor*
Five two-hour tapes PLUS the course notebook
(from the three day course at SBSD)
Evaluation of Lamp Filament Evidence—*Lowell Bradford, Instructor*
FTIR Lecture—*Wayne Moorehead, Instructor*
Gunshot Residue Lecture—*Ray Calloway, Aerospace, Instructor*
Footwear—*Bodziak, Instructor*, Two tapes

Please address requests to:

Dean Gialamas / Sandy Wiersema, T&R Co-Chair
c/o Cal Lab of Forensic Science
17842 Irvine Blvd. Suite 224
Tustin, CA 92680

Hayward Classroom Location:
Forensic Analytical Specialties
3777 Depot Rd., Hayward

Hayward Hotel Information:
Vagabond Inn, 20455 Hesperian Blvd. Hayward (510) 785-5480 or Executive Inn, 20777 Hesperian Blvd., Hayward, (510) 732-6300

Santa Ana

207A:***Microchemical Methods**
Mar 27 - 31, 1995
504:**Forensic Microscopy**
Mar 13 - 17, 1995
520B:***Microscopical Study of Pigments and Extenders**
Mar 20 - 24, 1995

Santa Ana Classroom Location:
Orange Co. Sheriff's Office
320 N. Flower St., Santa Ana

Santa Ana Hotel Information:
Crown Sterling Suites, 1325 E. Dyer Rd., Santa Ana, (714) 241-3800
For registration details and tuition price please contact Nancy Daerr at McCrone Research Inst., 2080 S. Michigan Ave., Chicago, IL 60616. Phone (312) 842-7100, FAX (312) 842-1078.

* Prerequisite: Course 201 or equivalent.

Course Descriptions

201: **APPLIED POLARIZED LIGHT MICROSCOPY** — A survey course emphasizing techniques for proper use of the polarizing microscope: illumination methods, photomicrography, micrometry, crystal test, dispersion staining, visual thermal analysis (fusion methods) and small particle identification. Special methods such as darkfield, phase, fluorescence, interference, UV and IR microscopy, photomicrography, electron microscopy and microprobe analysis are discussed as they apply to the polarized light microscopist.

207A*: **MICROCHEMICAL METHODS** —Intended for microscopists who wish to obtain chemical information directly from micro samples. The coordinated use of microchemical, optical crystallographic and morphological data to identify real world samples will be stressed. Topics to be covered include: Staining and microcrystal tests (for cations, anions, elements, organic compounds and complex substances), working on microscope slides and in capillaries, solubility, melting points, subnanogram samples, etc. Microchemical examination of knowns and unknowns from a wide variety of sources (metals, drugs, minerals, paint pigments and media, etc.) will be an integral part of the instruction.
Instructor: Skip Palenik

503: **PHARMACEUTICAL MICROSCOPY** — Identification of particulate contaminants and examination of the solid state (e.g. polymorphism, solvation and particle size). *Instructor: Gary Laughlin*

504: **FORENSIC MICROSCOPY**—This course covers comparison, characterization and identification of trace evidence using crystallography (morphology and optics), dispersion staining and microchemistry. All tools and techniques will be applied to common crime lab trace evidence: hair, other fibers, glass, explosives, drugs, paints, soils, etc.

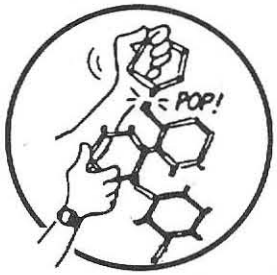
507: **FIBER IDENTIFICATION**— Optical characterization of natural and synthetic fibers using the polarized light microscope. *Instructor: Skip Palenik*

520B:* **MICROSCOPICAL STUDY OF PIGMENTS AND EXTENDERS** — This course concentrates on the microscopical and microchemical investigation of both automotive and architectural paints from the forensic science point of view. It is intended to be complementary to the course in forensic paint examination offered by Scott Ryland of FDLE.

Topics to be covered include: sectioning methods and examination of layer structure by transmitted polarized light and epi fluorescence microscopy; identification of inorganic pigments and extenders by morphology and optical crystallographic properties and qualitative microchemical tests; and microchemical reactions for the identification of some polymer binders.

This course also reviews optical crystallography (as needed for the determination of optical properties of inorganic extender and pigment sublimate crystals) and high magnification / resolution microscopy using oil immersion objectives. *Instructor: Skip Palenik*

701: **COMPUTER ASSISTED MICROSCOPY** — Learn the many ways computers can assist a microscopist. Start with basic principles, followed by hands-on tutorial sessions where you use spreadsheets, databases, image editing and image processing. Students work with both microscope and computer. A basic knowledge of microscopy is needed but no previous computer experience is required.
Instructor: Steve Shaffer.



Newest "Bathtub" Designer Drug May Replace Meth Labs

NEW YORK, NY - As one of the primary "ports of entry" into the United States, New York City is often the first to feel the effects of current trends...both good and bad. Such is the case with the newly discovered, easy-to-synthesize drug, that has appeared in America. Sporadic reports have been recieved in the New York City area, of overdoses of a "synthetic cocaine". Hospital analysis of the drug revealed that it is not cocaine, but a synthesis involving the over-the-counter drug pseudoephedrine.

Nicknamed "Cat" by it's few users in the United States, the drug was first reported by law enforcement officials in the former Soviet Union.It's real chemical name is Methcathinone. It is thought to be somewhere between cocaine and methamphetamine in strength, and has many of the same effects as both drugs. In lower doses, users describe a "feeling of euphoria" and well being with the world. It causes overt alertness and rapid pulse, breathing, and increasing blood pressure. In higher doses, it can cause sleeplessness, agitation, paranoid delusions, agressive behavior, seizures, and even death.

Drug control experts say that "Cat" is of particular significance because it can be reproduced without the use of "telltale" precursor chemicals that have been used to produce methamphetamine. Police officials have often been able to located "Meth Labs" due to the use of smelly and volatile chemicals that are necessary to produce the "speed". Methcathinone doesn't require the same materials and the chemical reactions that

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Section Reports

NORTHERN

George Sensabaugh (UC Berkeley), **Jennifer Mihalovich** (FSA) and **Jennifer Griggs** (SERI) hosted the March 3, 1994 dinner meeting at the Milano Restaurant in Emeryville. The guest speaker was **Pierre A. Margot**, Director of the Institute of Police Service and Criminology and Professor at the University of Lausanne. He described his laboratory at the University of Lausanne and discussed the legal system in Switzerland. Twenty nine individuals attended the meeting.

Bob Garbutt and **Anne Murphy** (Sacramento County Lab) hosted the April 28, 1994 dinner meeting. The guest speaker was **Michael Prodan**, a DOJ Special Agent. Twenty seven individuals attended the meeting.

DNA STUDY GROUP
Chairs: **Gary Sims**, DOJ-DNA and **Jennifer Mihalovich**, FSA

The DNA Study Group met on March 3, 1994 at the DOJ-DNA Laboratory in Berkeley. **Jan Bashinski** (DOJ) discussed papers that were presented at the AAFS meeting in February 1994.

DRUG STUDY GROUP
Chairs: **Diane Bowman** and **Mary Trudell**, Oakland PD

The Drug Study Group met on April 7, 1994 at the Oakland Police Dept. The guest speaker was **Jim Heagy** (DEA). His topic was LSD Source Determination.

TRACE EVIDENCE STUDY GROUP
Chairs: **Diane Bowman**, Oakland PD and **Pete Barnett**, FSA

The Trace Evidence Study Group met on April 28, 1994 at CCI. The guest speaker was **Faye Springer** (DOJ). She discussed how she approaches trace evidence cases and the microscopic examination of fibers. This presentation was videotaped.

SOUTHERN

A dinner meeting/workshop was hosted by the CAC Training and Resources Committee (sponsored by the CAC McLaughlin Endowment Fund) on Jan. 27, 1994 at the Orange Co. Sheriff's Dept Lab. A Stress Management Workshop was presented by **Madelyn Burley-Allen** of Dynamics of Human Behavior. Dinner followed at Robbie's Bar & Grill in Santa Ana where a magician, **Bob Jardine**, provided stress free entertainment (hosted by a local group of private consultants).

A study group/dinner meeting was hosted by **Phillip M. Kellet**, San Bernardino Co. Sheriff's Dept on Mar. 23, 1994 at the Magic Lamp Inn in Rancho Cucamonga. Special Agent **Bob Sibert** (FBI) topic was Drug Fire.

The following study groups met on the same day:

SEROLOGY STUDY GROUP
Chairs: **Dave Stockwell**, SBSD and **Dean Gialamas**, Cal Lab

ABC Certification/Recertification was discussed as well as a round table case discussion led by Dave Stockwell.

DNA STUDY GROUP
Chairs: **Rob Keister**, OCSD and **Erin Riley**, LAPD

John Hartmann led a discussion of the TWGDAM meeting. ABC Certification/Recertification was discussed. A sample exchange for D1S80 testing. **Mary Hong** and **Steve Renteria** reviewed papers presented at the AAFS meeting in Feb. 1994.

DRUG STUDY GROUP
Chair: **Penny Laferty**, OCSD

John Davis gave a presentation on a clandestine laboratory involving the synthesis of methamphetamine, MDMA and phenyl-2-propanone. **Tom Abercrombie** provided a brief description of an MDMA laboratory he was involved with. Future drug study group activities were discussed.

BLOOD ALCOHOL STUDY GROUP
Chair: **Dan Nathan**, LASD

The following topics were discussed: 0% Tolerance Law, CAP Test Results and SBSD breath instrument contract program.

American Board of Criminalistics

General Knowledge / Specialty Exam Offering

The next offering of the GKE will be in conjunction with the Fall/94 CAC meeting in Pasadena, Oct. 18-22, 1994. Along with the GKE, and depending on the need, the following Specialty Examinations will be offered: Drug Specialty Exam; Fire Debris Specialty Exam; Forensic Biology Specialty Exam (Core Exam plus Biochemistry and Molecular Biology Modules)

Individuals taking Specialty Exams must be a Diplomate of the ABC or be scheduled to take the GKE at the same time.

Diplomate certificates will be awarded to individuals who successfully complete the GKE. The requirements for Fellow status are successful completion of the GKE and Specialty Exam along with documentation of your annual participation in an appropriate proficiency testing program.

The sitting fee for individuals taking the GKE in 1994 is $120. Each Specialty Exam/Module is $75. The maximum amount an individual will pay for Specialty Exams will be 3x the current Specialty fee.

A completed application along with a $30 application processing fee must be submitted to the American Board of Criminalistics, ABC Registrar, 4 Mannakee St., Rockville, MD 20850 (please note new registrar address), NO LATER THAN 60 DAYS PRIOR TO THE EXAM OFFERING. For this offering, applications must be post marked no latter than August 22, 1994. There will be no exceptions made regarding this deadline.

Diplomates of the ABC requesting to sit for a specialty exam must notify the ABC Registrar (see above) in writing NO LATER THAN 60 DAYS PRIOR TO THE EXAM OFFERING.

For an application and/or study guides to Specialty Exams, please send your request to the ABC Registrar. FAX (301) 413-2466

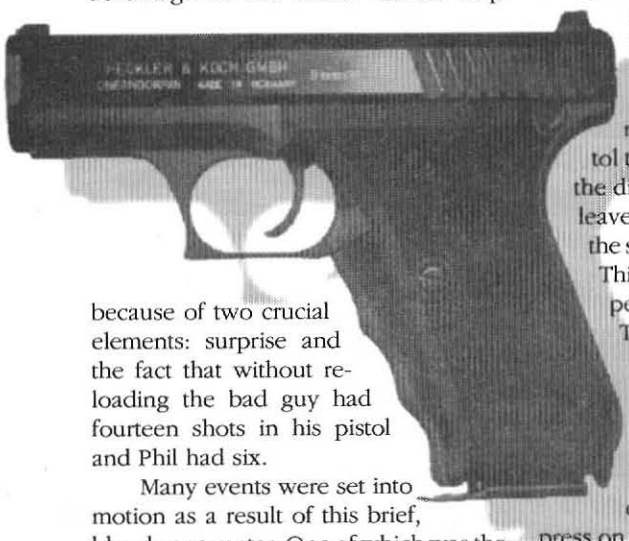
If you are planing to take an exam, please telephone me as soon as possible. I need your input on which day of the week would work best for everyone. Would you rather take the exam on the day before the meeting starts or the traditional Saturday offering? Which part of the day would be best to take the exam- morning (0800—1100), afternoon (1300—1600) or evening (1800—2100)? Based on how many different exams the ABC will offer, we will most likely have the exams spread out on two different days.

—Steve Renteria
ABC Representative
(213) 226-4978

The Toolmark Signature of the 9mm Luger Caliber Heckler & Koch Semi-Automatic Pistol

Carl A. Leisinger, Lieutenant,
NJ State Police
Reprinted by permission from the Author, Originally printed in the New Jersey Association of Forensic Scientists Newsletter Vol.3 No.1, Jan 1994.

This forensic article has its origins on Rte. 80, on a snowy evening back in December 1981 during rush hour traffic. My classmate, Trooper Phillip La Monaco, was murdered by members of a revolutionary group with a fourteen-shot semi-automatic pistol. Phil was at a disadvantage in this motor vehicle stop because of two crucial elements: surprise and the fact that without reloading the bad guy had fourteen shots in his pistol and Phil had six.



Many events were set into motion as a result of this brief, bloody encounter. One of which was the seismic shift in attitudes towards the revolver. The revolver was being phased out by many departments over the years for a high capacity, quick-loading semi-automatic pistol. As a young trooper stationed at the Malaga Barracks in Gloucester County back in 1973, I had occasion to meet with officers from Pittman P.D. They were carrying 9mm Luger caliber S&W (Model 39) semi-automatic pistols, and this made an impression on me that this was the only way to go. Little did I know that ten years hence I would be part of the process of selecting a new semi-automatic pistol for the New Jersey State Police.

The ultimate selection was the 9mm Luger caliber semi-automatic pistol manufactured by the German firm, Heckler and Koch (H&K). The Germans have a reputation for making fine firearms and the H&K is no exception. So well made that we in the firearms identification field did not anticipate the difficulty of matching discharged bullets and shells to an individual H&K pistol. Obviously this would not be a criteria we would use to select a pistol for use by the state police. It was just one of those "fly-in-the-ointment" sort of difficulties encountered later that makes life a little difficult. And yes, it did!

The H&K pistol is a traditional gun in operation, but different in that it relies on the gas produced by the discharge of the cartridge to hold the slide forward rather than pushing it to the rear. This is called a gas retarded, or blowback action. When the gas pressure subsides the slide will then travel to the rear, ejecting the spent shell and picking up the next cartridge from the top of the magazine and pushing it into the chamber.

The ejector is the mechanism of the semi-automatic pistol that is responsible for removing the discharged shell from the gun. It leaves a toolmark on the rear-face of the shell on its outermost perimeter. This toolmark is smaller than the period at the end of this sentence. The shell is the source of numerous toolmarks left by the host pistol. The chamber of the pistol is fluted to aid the shell's release from the from the chamber both during and after its obturation. These flutes also impress on the walls of the shell a series of unique class and accidental toolmarks. The traditional source of marks used to match a discharged shell to a pistol is the primer. It is rich in firing pin and breech face marks. Upon examining hundreds of H&K discharged shells, we have not found any usable marks. The firing pin leaves no concentric marks from manufacturing nor any accidental marks. There are also no breech face marks — when viewed with the comparison microscope the primer is as smooth as a baby's gluteus. Unless H&K changes their quality of manufacturing, these two areas won't be good places to view usable toolmarks.

The heart of the gun is the barrel. The H&K barrel is not rifled with the usual sharp lands and grooves. The H&K barrel has a polygonal rifling. This rifling method results in less bullet damage, less displacement of bullet metal, less resistance and yields slightly higher velocity.

Traditional rifling consists of lands (raised portions) and grooves (depressed portions). The lands are almost at right angles to the top of the groove. The top of the land is flat (actually it is slightly concave) but it appears straight. When an examiner views the aforementioned rifling it is very sharp and pronounced.

Not so with the Heckler and Koch. It appears that the rifling is parabolic in shape and has absolutely no right angles. It almost gives the impression of badly worn traditional rifling. There are no sharp right angles, just mild humps where the lands would be and very shallow depressions where the grooves would formerly occupy.

As supervisor of the Ballistics Unit with ten years of microscope experience, this particular gun offered an interesting challenge. We broke new ground in knowing what to look at and in knowing which areas would give the best return for the time spent.

We started to look at bullets and shells from the test pistol as soon as we were issued the pistol for duty in 1983. The initial shock was the impression left by the ejector. The ejector punches a depression into the rear face of the shell that in itself is rich in toolmarks. Our armorer, SFC John Jacobs, was test firing an H&K so I picked up about ten shells and proceeded to view them under the comparison microscope, comparing them against each other to familiarize myself with this new gun and its marks. (Now keep in mind we have not looked at this gun before with its unique marks; this was virgin soil.) I looked at these shells (ejector marks) and they looked good—bold marks (class) and very few fine marks (accidental), not a match yet but not far from saying so in my own mind. Then I discovered John was shooting numerous H&K's. I was looking at shells fired from numerous H&K's and the ejection marks looked remarkably similar, and I mean very similar. At this point I said, "Whoa Carl," we are looking at different guns making almost the same mark. Different guns with almost matching ejector marks.

It was time to look very closely at class/accidental marks. The ejector mark (class characteristics) is half an oval on the base of the shell on the extreme edge. Within this oval are very pronounced groove marks and they almost match from different guns! I always knew the Germans pride themselves in precision but this was carrying it too far. I believe an examiner with limited experience would have determined that all of the shells came from the same gun. Upon

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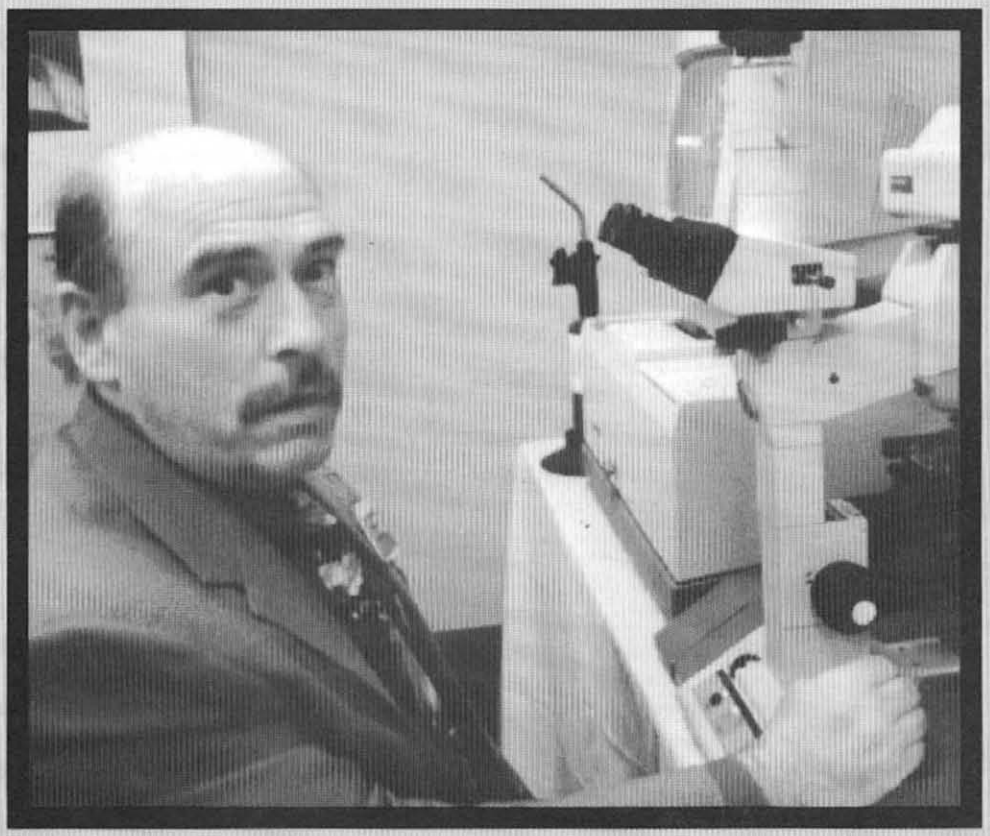
Springtime

Celebrating their fiftieth year, the Oakland Police Department Crime Laboratory hosted the Spring 1994 CAC Seminar. Under the direction of Seminar Chair and CAC President-Elect Mary M. Gibbons, the meeting was kicked off by a trio of well-attended workshops. Courtroom Testimony, FT-IR Operations and DNA Users group meetings were the highlights of the first day of the event.



in Oakland

H&K toolmarks

further extensive microscopic examination, it was determined that the groove marks were different from each gun and consequently not a class characteristic but accidental. The fine marks within the groove marks were few and very difficult to examine. Also, to add to the difficulty, was the actual viewing area. The same ejector (same gun) would sometimes just barely hit the shell and leave very little total area to be identified.

Experience is a great teacher, and the law of large numbers enhances this knowledge. We had experience but not with this gun. We were in the infancy of our experience with this gun, so we proceeded cautiously, not having the benefit of large numbers to build a good data bank from which to retrieve information.

In descending order, the best areas to look for marks on traditional semi-automatics are the primer (breechface and firing pin marks), extractor, and ejector marks. The H&K doesn't follow this order. The breechface and firing pin marks are moot; the gun just doesn't leave any usable marks in this area. The only other gun that could parallel the H&K is the .30 cal carbine of WWII vintage. It also left very few marks in the breechface area. Now for the obverse side of this dilemma. Good marks can be observed on the side, or the wall of the shell left by the flutes of the chamber. The flutes in the chamber walls of the barrel aid in the extraction of the shell by allowing gas to get between the shell and the chamber wall.

This is an excellent area to look for good accidental marks. The class characteristic of this area comprises seventeen flutes cut into the barrel. The chamber marks have, over the years, been demonstrated to be a rich area of marks to identify a shell from a particular gun.

The extractor in the H&K is another source of marks but it's very weak. It serves to indicate when a cartridge is in the chamber as well as extracting a loaded cartridge. When firing occurs, the force to pull the discharged shell from the chamber is not accomplished via the extractor but rather the blowback force instituted by the immense gas pressure. Consequently, it doesn't forcefully rip the shell from the chamber while still under pressure as in most semi-automatics. As a result our usual rich source of toolmarks from the extractor aren't abundant. The H&K will function without the extractor. The blowback force will push the shell out of the chamber and force the slide back and the ejector will cause the shell to clear the pistol.

The important areas for toolmarks on a discharged shell from an H&K would be: 1. Ejector marks (good), 2. chamber flute marks (good), 3. extractor (poor) and 4. primer (no marks).

The discharged bullet is the heart of any forensic evidence from the scene, especially is it shows a direct link from the body to a gun á la Locard's "Exchange Principle." The shell is at times a loose link but the bullet is the best piece of evidence for three reasons. One, a direct link to a particular gun, two distance determinations and three, pedigree (ATF search). It all aids in the prosecution of a suspect.

> Upon examining hundreds of H&K discharged shells, we have not found any usable marks.

As described previously, traditional rifling has sharp angles and makes good accidental marks and always outstanding class characteristics. The rifling on the H&K pistol is polygonal as has absolutely no sharp angles, just gentle sloping hills and valleys. This non-traditional rifling has a few problems forensically in reference to firearms identification. One is the location of a good starting reference point in viewing the bullet for a good sequence.

The tool used to view and compare two bullets is the comparison microscope. With this instrument one microscope views the bullet from the scene and another views the bullet from the suspect gun. A scan is done of the scene bullet for any outstanding marks made by the rifling, and a check is made for a similar mark on the test bullet. The two bullets are aligned and rotated together. If the two bullets are from the same gun there may be a plethora of matching repeatable marks. Of course there are slight variations on this theme but this is the basic nuts and bolts of matching bullets. It takes a sharp eye and time to train an examiner to become an expert in this field of microscopy.

Another problem with the H&K is the tendency of the bullet to slip somewhat when going out the barrel. Instead of staying rigidly in the tracks of the rifling, the bullet shifts slightly causing a once good mark to become slightly distorted. This is not an absolute but it happens enough to give an examiner a difficult time.

The two aforementioned reasons

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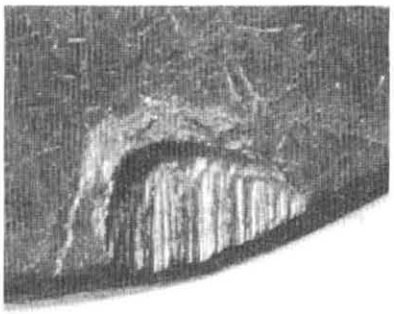
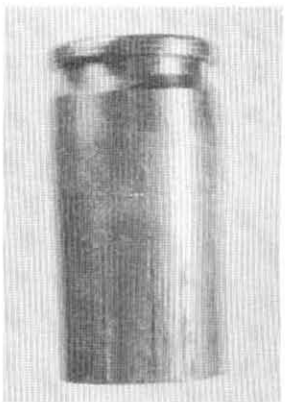
Now You See It



Leisinger's article. At left is a photomicrograph of the ejector mark, and below is an example the fluted chamber markings.



These photographs, courtesy of Ed Peterson, Santa Clara DA's lab, illustrate some of the markings referred to in

Margaret Barber
Ventura Sheriff's Crime Lab

CHEMICAL STRUCTURE

Heroin is *diacetylmorphine* — a Schedule I drug, meaning it has no accepted medicinal use in the United States. It is derived from morphine through the replacement of morphine's phenolic and alcoholic OH groups by acetyl groups.

(Codeine is methylmorphine with the methyl group added to the phenolic OH.)

Heroin is referred to as an opiate because it is derived from the opium poppy *Papaver somniferum L.*

Since there are now many synthetic opiate-like drugs, the term "opioid" is used to include these compounds which have morphine-like pharmacological actions as well. Opioid can also mean any directly acting compound the effects of which are stereospecifically antagonized by naloxone, as is morphine.

"Narcotic analgesic" means "pain killer," but "narcotic" is not used in a pharmacological context any longer because of the term being used very loosely by the public and in the H&S Code to refer to any illegal drug.

Heroin is a semi-synthetic drug because it is commonly produced by altering a natural alkaloid — morphine.

Opium is approximately 10% morphine and 0.5% codeine. There are about 20 alkaloids present in opium, most of which are not pharmacologically significant.

MANUFACTURE

To make heroin, the unripe seed pod of the poppy plant is scored with a sharp instrument and the milky exudate is collected. This is opium. Opium dries to a brown sticky mass. It is treated with acetic anhydride or acetyl chloride to convert the morphine to diacetylmorphine. Water is added to change any unused acetic anhydride to acetic acid. The solution is washed with chloroform to remove impurities. The aqueous layer is made basic with sodium carbonate or ammonia. If allowed to stand, the heroin will slowly precipitate out of solution. "Cuts" are added to the filtered out precipitate and a small amount of conc. hydrochloric acid is added to convert the heroin to the hydrochloride salt form. Sugar cuts may still be added down the line as the product is sold.

There are variations on this method and each "chemist" has his own particular "tricks" he likes to use. "Tar" heroin is typically produced by acetylation of the crude opium without any cleanup steps. The main impurities found in heroin are 6-monoacetylmorphine and acetylcodeine.

Heroin may be made from codeine by demethylation to produce morphine which is then acetylated, but this is not common. Yields vary with methods and there is usually a significant loss in converting the codeine to morphine.

The most common "cuts" in this part of the country are lactose, mannitol, procaine and lidocaine. Other areas (worldwide) also report dextrose, talc, baking soda, quinine, strychnine, caffeine, phenacetin, lemon juice, antipyrine, boric acid, mercurous salts (calomel), and dog manure.

HISTORY

Opium use was widespread before 1800. It was used as a remedy for many ills. The most common were diarrhea and dysentery. In 1806, the German pharmacist Serturner isolated morphine. Several of the other alkaloid soon followed. By 1850 the hypodermic syringe was invented and use of the pure alkaloids was becoming widespread in the medical world. Severe compulsive drug use soon followed. Morphine addiction was known as soldier's disease in civil war times. Opium continued to be available until 1900s.

Diacetylmorphine was first synthesized from morphine in 1874. In 1898, Bayer introduced "heroin" — its trade name for diacetylmorphine — commercially in hopes that acetylation of the morphine molecule would reduce the side effects. Heroin was to be the "wonder drug" as its name indicates. But it turned out to be at least as addicting as morphine. By 1924 New York claimed heroin was responsible for 75% of all crimes.

Powder heroin was the common form on the street until recent years. In about 1989, "tar" heroin began to appear on the street and has now completely replaced powdered heroin in this part of the country. "Tar," which runs between 40-70% heroin, is more concentrated than the powder, which is usually 10% heroin or less in this geographical region. Recent submissions of "tar" to the Ventura lab were found to contain approximately 44% heroin. Powder heroin is less concentrated than "tar" simply because alot of cuts or sugars are added to it. Sugar or other cuts may be mixed in with "tar" heroin as well, but this is not as common.

Powder heroin may be white or brown. Brown is the socially accepted color for this area. "Tar" has the appearance of roofing tar. It is dark brown and sticky. With exposure to air it dries and loses its stickiness becoming more brittle.

Powder heroin is usually sold in 0.10 gram or more quantities in "penny balloons" or less commonly in paper bindles. "Tar" is usually wrapped in a small piece of plastic or foil and most often weighs from 0.05 to 0.10 grams.

DISTRIBUTION

Heroin and 6-MAM cross the blood/brain barrier much easier than does morphine. Heroin also crosses the placenta and is found in mother's milk. Heroin is rapidly metabolized in the tissues to 6MAM and morphine. Morphine is responsible for the pharmacological effects of heroin. Heroin is excreted in the urine as free and conjugated morphine, which is morphine glucuronide.

The half-life of heroin is about 3 minutes after intravenous injection. It may be detected for up to 36 hours. Morphine (the metabolite) does not persist in tissues and will be in very low concentrations after 24 hours.

PHARMACOLOGIC EFFECTS

The effects of opiates are drowsiness, euphoria, respiratory depression, constricted pupils, nausea, decreased gastrointestinal motility, analgesia, mood changes, and mental clouding. (Mental clouding is referring to symptoms of

drowsiness, inability to concentrate, apathy, lethargy and decreased visual acuity.) Larger doses (15-20 mg) cause an increase in these effects. But even large doses do not cause slurred speech or significant motor incoordination. Morphine selectively relieves pain without affecting other sensory input such as touch, vibration, vision (a reference to hallucinations I suppose), or hearing. A painful stimulus may be recognized but not percieved as painful.

The analgesic effects of morphine are due to its action on the central nervous system. Opiates do not alter the threshold or the responsivity of nerve *endings* nor do they impair the transmission of the nerve impulse along peripheral nerves. Animal studies on how morphine effects the CNS have been done. Electrical stimulation to certain pain centers in the brain could be avoided by pressing a lever. When morphine was given is doses that did not cause gross sedation, the lever pressing activity was reduced. When the stimulation intensity was increased, the lever pressing increased. This indicates that morphine raises the threshold stimulus required to produce pain. (Even though the stimulus is apparently still felt at lower intensities, it is not painful.)

The effect of morphine on pleasure centers is inconsistent. Both raised and lowered thresholds have been reported.

Morphine causes a slight decrease in body temperature in man. However, chronic high doses will cause a rise in temperature. The effects are also species dependent. Some animals, such as the cat, which experience excitement and mania from morphine, also experience a rise in body temperature.

Morphine causes pupil constriction (miosis) even in total darkness in man. This is due to its action on the oculomotor nerve rather than any direct action on the pupillary sphincter itself. No tolerance is developed to this effect. The effect of morphine on the pupil varies with species independently of whether the animal is excited or sedated by morphine. Monkeys are sedated, but show dilation of the pupil (mydriasis).

Morphine depresses respiration in part by direct effect on the brain stem respiratory centers. This effect is discernible even with doses too low to produce sleep or disturb consciousness. Respiratory depression is increased proportionately to the dosage given. In man, death from morphine is almost always due to respiratory arrest.

The cough supressant effect of narcotic analgesics is not related to the respiratory depression.

Morphine delays the passage of gastric contents through the duodenum for as long as 12 hours. It also reduces secretions from the gall bladder, pancreas, and small intestines. Nausea and vomiting are triggered by direct stimulation of the "chemoreceptor trigger zone (CTZ) for emesis (vomiting). Motion sickness drugs can sometimes help. The propulsive contractions of the large and small intestine are reduced by morphine. The tone of the anal, urinary and bile sphincters is increased. The release of anti-diuretic hormone (ADH) causes a decrease in urinary output. The action of morphine on the CNS causes and inattention to the stimulus for elimination. Put this all together and you have constipation, an inability to urinate even though one may need to, and an increase of fluid pressure in the bile duct causing epigastric distress in some cases.

Put this all together and you have constipation, an inability to urinate and an increase of fluid pressure in the bile duct...

Morphine may prolong labor in pregnant women. However, if the uterus is hyperactive due to oxytocics, morphine may return contractions to normal. The CNS effects may also make the mother less able to cooperate in the delivery and the baby may experience respiratory depression due to its immature blood/brain barrier even if the mother does not have respiratory depression.

Morphine cause dilation of the blood vessels of the skin. The face, neck and upper torso may become flushed and warm. This is caused by a release of histamine. Histamine is probably the cause of the urticaria (inflamation) seen at injection sites.

DOSAGE

The usual dose for morphine is 10 mg/70 kg body wt. intramuscular (IM) or subcutaneous (SC). The average oral dose is 60 mg but is not as effective as injection due to first pass metabolism in the liver. The equivalent dose for heroin is 5 mg IM or SC or 60 mg orally. Because tolerance develops so quickly and there is great variation in individual sensitivity to the drugs, it is hard to state an amount that is toxic or lethal in man. Toxic reactions to adulterants and diluents must also be considered in heroin deaths.

USAGE

Heroin can be injected IV or subcutaneously, snorted, smoked, taken orally, sublingually, or rectally. But it is most commonly injected IV or SC.

HAZARDS

Fibers of cotton can cause pulmonary arteritis.

Heroin insufflation (snorting) causes wheezing, pulmonary edema, and chronic lung disease.

Bacteria cause septic embolism and lung abscess, endocarditis, or bacterial pneumonia.

Injection causes abscesses, phlebitis, and cutaneous scarring.

REFERENCES

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Canine Accelerant Detection Teams: Validation and Certification

J.D. DeHaan

INTRODUCTION

In 1986, Connecticut State Police and BATF pioneered the use of canines in sniffing out residues of flammable liquids at arson scenes. The first field dog "Matty" proved to be a real asset to investigators throughout the Northeast. Canine accelerant detection teams have become more widely used each year since the first successful effort. There are now teams in almost every state and training of new dogs is being conducted by at least seven police or fire agencies and myriad private trainers. State Farm and Aetna have both underwritten the costs of training dogs and handlers for police and fire departments across the country. All this means that there are now 15 teams in California and at least one team in each adjoining state.

The canine olfactory system is capable of detecting on the order or 0.01 ul (10 nl) of gasoline under good conditions, far below the detection limit of 0.1-0.5 ul normally cited for laboratory methods. Since debris recovered at locations indicated by the canine is normally submitted for lab analysis, this gap in sensitivity could lead to problems where "negative" lab findings are reported on "positive hits" of the canine. Sincere there is no way to cross-examine the canine about its method of analysis, reproducibility, accuracy, or discrimination, the only means to assess its reliability is by its performance on a standardized test. Since the canines in use today come from several different training programs and some are trained to point-and-sit (passive alert) or dig-and-paw (aggressive/active alert), any test protocol must allow for these variations.

In cooperation with the CA State Fire Marshal, the author has developed a test protocol which has been reviewed nationally and which was implemented in tests administered in January and March of this year. This paper will describe the preliminary tests and the certification test protocol.

This paper was voted "Most Outstanding Paper" of the Spring 1994 Seminar, Oakland, CA.

CANINE DETECTION

Dogs have been used for centuries to hunt and seek due to their excellent olfactory capability coupled with a drive to cooperate with a human handler. Dogs are trained to respond to the desired stimulus by exposing them to it followed by positive reinforcement. This reinforcement can be in the form of food (food reward), praise, or play (play reward). The process is repeated and reinforced over time. Refinements include discrimination training by discouraging response to similar but undesirable stimuli. Because of their olfactory prowess and strong hunt/play drive, retrievers of various types are very suitable for detecting arson accelerants. Because they must work around people other than their handler in a variety of situations, a calm and friendly demeanor is essential. Once again, retrievers are found to be excellent in this regard. Both food reward (dry kibble) and play reward (tug-toy or chew toy) are used. Dogs are typically trained on evaporated gasoline as a primary target and other flammable liquid accelerants such as diesel fuel, kerosene, charcoal lighter, lacquer thinner (and sometimes acetone and methanol) as secondary targets. The desired response can be either a point-and-sit, called a passive alert, or a dig-paw-and-bite, called an active or aggressive alert. All variations are being used successfully in the field today.

EARLY TESTING

In 1992, the author conducted three test series of a privately-owned canine in Southern California. Sets of 20 samples were prepared and sent as a blind test to the dog's owner/handler. Each set contained several "blanks" of various substrates (carpet, plastics, plywood) and specimens containing 10-20 ul of flammable liquids spiked onto the debris in each can. Subsets of five cans were selected, opened and set out in an indoor area known to be free of interferences. The dog was then instructed to search the cans. Any positive alerts were recorded, with all tests videotaped for later review. The cans were resealed and returned to the laboratory for confirmatory testing by passive absorption/elution and GC/FID analysis. Any sample whose content could not be confirmed by post-test analysis was considered invalid.

These early tests revealed the continuous improvement of the canine/handler team with time, training and practice. From the first set (A) of 20 samples, where a 55% accuracy was recorded including two false positives (to carpet blanks) and the second (B) where 50% accuracy was recorded including two false positives — one to carpet and one to vodka, to sets C and D, each with a 75% accuracy. Sample set C used 5-10 ul spikes and 3 of the 20 samples could not be confirmed by GC after examination. By the standards developed in later testing (discarding as "invalid" such samples), the accuracy rate became 14/17 or 82%.

The first three tests indicated a possible distraction provided by the cans and it was decided that future tests would involved removal of the targets from the cans. Sample set D was prepared using 2-5 ul quantities of various flammable liquids and was examined by the original canine team and a second team which had been trained separately. Both dogs scored more than 75% accuracy and the results for the two dogs matched 80% of the time (16 of 20 samples) and differed only on a lacquer thinner (3 ul), a vodka target, and a carpet blank. Both dogs successfully detected 0.5 ul of 50% evaporated gasoline on charred carpet, as did laboratory testing.

CERTIFICATION TESTING

In January 1994, 7 of the 14 canine teams in California were tested according to the protocol circulated nationally for comments in October 1993 (see attached draft, App. 1). Two abandoned houses were prepared in Fresno, one for "can" tests and a second one for "burn room" tests.

In the first phase of this test, a set of 20 cans were prepared in the CCI laboratory for each canine. Each can contained a piece of burned substrate (plywood, carpet/pad, plastic-polystyrene/polyethylene, or upholstery-fabric/urethane cushion). Fifteen cans of each set were selected at random and between 10 and 30 ul of flammable liquid was added to each. The flammable liquids were: 50% evaporated gasoline, acetone, lacquer thinner, cigarette lighter fuel, diesel fuel, and kerosene. The remaining five cans of each set were blanks. Five cans were opened at a time and the targets placed out in a room which had been previously checked by the canine team. The targets were allowed to sit for 10 minutes before the team examined them and were replaced into the same cans immediately

after examination. All 20 cans were then lab-tested by passive charcoal trap/elution and gas chromatography. Of the 150 cans examined, only one was found *not* to contain the accelerant it was designated to contain. *All* sets were equal; the amounts of liquids were varied only to maintain adequate sample a vapor pressure throughout the test; less of gasoline and kerosene, more of acetone (easily lost by evaporation) and diesel fuel (low volatility/vapor pressure).

A score sheet, such as App. 2, was used for each team. The reverse was used to record the locations of placement of the targets. Note that there is space for preliminary (labeled) contents as well as lab confirmation of the contents next to each sample. Each team examined "their" test room prior to placement of any samples. This phase went well considering the newness of the test protocol. Some handlers misunderstood instructions; and scoring alerts (hits) on five targets at a time was confusing sometimes. All tests (including pre-test instructions) were videotaped for later reference. One handler did use the video to review the "calls" made and correct any scoring misunderstandings.

The small quantities of liquid minimized the chance of transfers between the samples and the test-room floors (tile or wood). One dog remembered (?) a phone book and indicated on it after the target was removed. Because all test samples were double-blind (coded sample cans which were "unknown" to the test administrators) there was no way of placing "hot" samples only over locations which had previously had "hot" samples. No other tests indicated any "memory" problem, but the locations of the test targets were changed between every test series and each dog had a different room (or area) for its tests. Later in the day some handlers were asked to take their dogs through rooms used previously and no canine showed any alerts to residues on the floor from previous tests. Finally, the low *false-positive* rate for all canines (less than 10%) indicated that no problems were posed by putting all 20 targets out in a single room. It was intended that all rooms would be equal but there were not enough "clean" rooms available and some dogs had to use hallways and stairwells. This will be avoided in future tests. It did appear that some handlers ignored or missed positive alerts and the videotapes will be duplicated for review and training purposes for the handlers involved.

The second phase of each test involved burning a room which had a bed, chair, carpet, pad, and sheetrock walls using a fire accelerated only with crumpled newspapers. Each team was allowed to examine the burned room for false positives. In the team's absence, 50 ul (one drop) of each of six flammable liquids were placed on six different targets in the room. After stabilizing for 10 minutes, the team was allowed to examine the room. Samples of any "indicated" material were recovered for lab analysis at the direction of the handler and numbered in sequence from 21 to 28. Two comparison samples could also be selected by the handler. If the team missed any targets, samples of the targets were recovered by the test team at the conclusion of the test for laboratory confirmation. Of the six liquids, gasoline and lighter fuel were routinely detected, kerosene and lacquer thinner less often, and acetone and diesel fuel - rarely. Water on the carpet made detection of acetone unpredictable and the cool temperatures (ca. 48°F) reduced the volatility of diesel fuel substantially. All seven rooms were as equal in size, fuel load, and fire damage as the test provider could make them. *All* "targets" were equal and presented on the same surface and in the same manner in each room for all teams.

RESULTS

The results of the testing conducted March 1993 — March 1994 are recorded in Table 1. Tests 1-7 are the certification tests conducted in January 1994 while tests 8 and 9 reflect the results of a modified test used for two aggressive-alert dogs in a retest in March 1994. Tests 10 and 11 are the results of two pilot tests administered in March 1993 which included no burn exercise. The results are samples *correct* for each canine —e.g., when a blank is offered, a "no alert" is the correct response and a "false positive" is recorded when a dog alerts on the specimen. The number of samples in each category reflects the number *verified* by lab analysis after the canine test. So test 4, for instance, had only two acetone-spiked targets and three diesel targets because one sample was verified to have diesel in it instead of the acetone intended. One sample in test 6 was supposed to contain gasoline but could not be verified by GC so it was considered an invalid sample, and the maximum score was 19 instead of 20. In test 10 and 11, vodka was used in three "blanks" since the dogs are not expected to alert on ethanol. Four of the gasoline samples in tests 10 and 11 contained 2 ul of gasoline and one contained 0.5 ul.

The burn scene scores are reflected in the comments at the bottom of Table 1. There were six spiked targets in each scene. In two of the scenes, acetone could not be verified as having been present due to water in the carpet pad, and so there was a potential of 5 correct at each of these scenes. On dog (#1) indicated on two additional areas which were sampled at the direction of the handler so that accounted for 8 samples. For the dog not trained on diesel fuel (#2) the diesel target was placed but not scored.

This testing resulted in two clear categories of scores: 50%, 52%, 61%, and 64% vs 70%, 76%, and 77%. All three high-scoring dogs were passive alert dogs and it was suggested that a modification to the test protocol might be necessary. Additional testing showed that the aggressive alert dog's attention was better maintained if the target were concealed in something that did not readily move away when pawed, allowing for a full dig-and-bit response. The supplemental testing conducted for two of the aggressive alert dogs in March 1994 resulted in an improvement of both dogs overall scores — from 50% to 61% and from 61% to 77%.

COMMENTS

Originally, a target passing score of 75% was selected (rather arbitrarily). This threshold appears to be valid in spite of the small number of dogs tested. Obviously, this passing score will be evaluated as more dogs are tested in future sessions.

The test as constituted now is unique because it provides both discrimination (via prepared samples) and scene testing (via direct exam of a spike scene) for each canine team. Several points are of interest:

1.The substrates are all common interior materials burned in an open natural gas flame bunsen burner to open flame. The fames are extinguished by smothering in the can. After being cooled, liquids are added by micropipette directly onto the substrate.

2.The cans are labeled on the lid and the bottom by scratching the code numbers directly on the metal. The solvents used in many inks could provide distractions. Forceps are used to transfer samples

from can to test room and back and are cleaned in MeOH between samples.

3. *All* samples are examined by GC/FID of a charcoal strip-absorption/elution extract. This confirms the validity of the test specimen, and guard against loss, evaporation or mis-labelling. This is important for the scene samples to confirm that proper samples were collected. If a canine did *not* alert to a known scene sample, at the conclusion of the search that material is collected and analyzed to verify that is *was* a valid sample. To date, the only samples not always recovered from the test scenes were acetone which had been spike onto water-soaked carpet targets.

4. Because of the canine's extraordinary sensitivity, the test areas must be examined by the team to be tested in that area prior to the placement of any samples. There is no other way to establish the absence of interfering residues.

5. Once samples are placed, some time (10 minutes here) must be allowed for the air currents to stabilize. Since a well-trained dog will cast about *above* any signal to see if the source is above the floor or on it, the vapors from flammable liquids will settle or flow downward and outward from their source. Time must be allotted for that to take place.

6. By the very nature of the test, placement of a single drop of a flammable liquid onto post-fire debris is not a true simulation of fire debris which is saturated over a large area or mass with a liquid accelerant. When test-fire debris is recovered for lab verification, care must be taken that *the* spot of debris where the accelerant was placed is recovered. When an active/aggressive alert dog is involved, that particular spot may well be bitten, chewed, or torn loose from the debris.

7. The test protocol was modified for aggressive-alert dogs by concealing each target in a clean, new cardboard box weighted by two bricks. This allowed the canine to dig and paw at the sample location without moving it out of the area (as was observed in the first tests). This modification was employed in retesting two candidates and their accuracy improved from 50% to 62% and from 61% to 77%.

CONCLUSIONS

No substrate material used (to date) provoked reproducible false positive alerts in the canines. Charred polystyrene, plywood, and upholstery materials produced no responses. some types of carpet produced no response while others, particularly rubber-backed carpet tile, evoked responses in several dogs. As a general rule, carpets, particularly foam or rubber-backed types, provide the greatest risk of false positives. Identification of the species generated by such carpets is a subject of a current research project by David Tranthim-Fryer of Western Australia.

Detection of 50% evaporated gasoline occurs as frequently as detection of fresh gasoline but detection of 55% evaporated kerosene was less frequent that of fresh kerosene. Beverage vodka was used as a source of ethanol rather than denatured alcohol since that avoided complications from whatever denaturant is used. Most dogs are avoidance trained so they do not respond to ethanol, however, occasional responses were observed.

When one looks at overall accuracy of 75%, it appears impressive. When one examines the success rate in terms of which "indicated" samples would be confirmed by laboratory analysis, the figure is even higher, approaching 90%. This means that the false positive rate is about 10%.

This reveals what a useful tool the canine can be for pointing out potential locations for lab analysis. The investigator must also remember that arson fires can be set without flammable liquids using ordinary combustibles as accelerants. A scene which provides *no* canine indicators may well be arson. It appears that both aggressive- and passive-alert canines can be of considerable value in helping investigators and more and more will be used. Our laboratories must work in concert with the handlers involved. It is clear that those canines whose handlers have involved local laboratories in the testing, training, and validation process have the highest success rates. Canines cannot replace laboratory analysis any more than lab services can replace digging out a fire scene to do a proper investigation.

The Forensic Science Committee of the IAAI is presently drafting a position statement endorsing the use of canines in conjunction with laboratory analysis and validation. It proposes to warn handlers of the risks of ever-interpreting positive or negative responses on the part of the canine without supporting laboratory analysis. It also encourages labs to maintain records of success and failure of canine "indications" to be supported by positive lab (GC) results as an on-going validation measure.

Detection limits are not the be-all-and-end-all of any forensic technique and the forensic community must work closely with the fire investigators to remind them that specificity is even more important than sensitivity for detection of any flammable liquid residues. Unlike bomb or drug dogs, accelerant canines are detecting substances which are normal to our everyday environment. The techniques exist today for forensic laboratories to detect nanogram quantities of flammable liquids, but because these substances are intrinsic to our mechanized world, merely detecting such quantities is of minimal evidential value. Collection, preservation, and timely and accurate analysis are still the critical needs.

The first certification diplomas will be presented to the four successful canine teams on May 19, 1994. The State Fire Marshal has promised on-going support for future certification tests as well as renewal of existing certificates.

ACKNOWLEDGEMENTS

The author would like to express his appreciation to Jim All, Marge Yarbrough, Scotty Baker, Tony Guevara, and Greg Smith of the California State Fire Marshal's Arson and Bomb Unit; to Dean Gialamas of Cal Lab and David Tranthim-Fryer of Chemistry Centre-Perth, for their enthusiasm and extensive support of this project. Thanks to CCI student aides Jennifer Allen, Catherine Wassman, and Peggy Herbert for their extensive work on preparing and analyzing the samples, to Fresno Fire Department for preparing the structures used, and to CCI staff Jim Jeffery for technical GC support, Annette Ayala for typing the manuscript, and Manager Victor Reeve for his patience in seeing this project through. A special acknowledgement is offered to Pat Miller of Master Canine and her partner, Sparky, for prompting this study and the time and effort they expended in seeing it through.

Table 1
Overall Accuracy - Can Tests

(# Correct / # Possible)

Test	Blanks	Gasoline	Diesel	Kerosene	Ltr Fuel	LacTh	Acetone	Total	Comments
1	5/5	1/4	0/2	1/2	1/2	1/2	1/3	10/20	A; FP=0; ALL; S=4/8
2	5/5	3/4	0/2	1/2	2/2	0/2	1/3	14/20	A; FP=0; Not trained on kerosene or diesel fuel; S= 1/5
3	2/5	4/4	2/2	2/2	2/2	2/2	2/3	16/20	P; FP=3; ALL;S=2/6
4	2/5	2/4	3/3	2/2	2/2	1/2	2/2	14/20	P; FP=3; ALL; S=2/5
5	5/5	3/4	2/2	1/2	2/2	2/2	1/3	16/20	P; FP=0; ALL; S=4/6
6	3/5	2/3	2/2	1/2	2/2	2/2	2/3	14/19	P; FP=2 ALL; S=4/5
7	4/5	1/4	2/2	2/2	1/2	1/2	0/3	11/20	A; FP=1; ALL; S=5/6
8	2/4	1/4	1/2	2/2	2/2	1/2	3/3	13/20	A; FP=2; Modified test format. Retest of Canine#1.* One can intended as a blank contained acetone (confirmed by GC).
9	3/5	4/4	1/2	1/2	2/2	1/2	4/4	15/20	A; FP=2; Modified test format. Retest of Canine #7.*
10	1/2(1/3)	5/5	(2/3*)	3/3	0	3/4	0	15/20	P; Early test. Same Canine as #6. Vodka used in three blanks. Evaporated kerosene used in place of diesel*
11	2/2(2/3)	5/5	(2/3*)	2/3	0	4/4	0	17/20	A; Early test. Same Canine as #7 & 9. Vodka used in three blanks. Evaporated kerosene used in place of diesel*.

Comment Key
A—Aggressive alert; P—Passive alert; ALL—Trained on all flammable Liquids; FP—False Positives; S—Scene

*Note: No burn scenes were used in these tests.

APPENDIX 1
Canine Testing Protocol (DRAFT)
General Comments:

FIRST, all of the testing conducted in this protocol is *blind* testing, which means that the person conducting the test does not know the desired response. This testing will be conducted in two forms—one being laboratory-prepared samples in cans, the second being simulated scene sampling.

SECOND, all of the "can" samples will be prepared by the CCI Laboratory and sealed in new metal paint cans (1 quart, lined or unlined, batch-checked by the lab prior to use). The bottoms and lids will be marked with a scribe or punch (no marking pens will be used) with coded sample numbers: A-35, C-22, D-55, etc. Burned substrates will be prepared by the laboratory from new materials (carpet, foam, plastics, etc.)

THIRD, each canine will have his/her own room or test area and own set of samples. All sample sets will be as identical to one another as is practical. Each room or area will be checked by the canine team ***prior*** to samples being introduced.

FOURTH, the test administrator (or designee) shall remove samples from the cans with a clean pair of document forceps, place them in the test room/area, and the secure the cans and lids in another area so they do not serve as a distraction. Immediately upon completion of the examination by the canine, the test administrator recovers all samples and replaces them in the correct cans and reseals them, ensuring that the matching lids are used.

FIFTH, the listed accelerant content will be used as a preliminary scoring measure, but the final scoring of accuracy will depend on the agreement between the canine's indication and the results of post-canine test laboratory analysis. This confirmatory testing is the only means of assuring that the samples have not evaporated, degraded, or been contaminated. Any samples whose post-test GC results do not match the accelerant content expected (i.e., the accelerant known to have been added), will be considered invalid and will NOT be counted in evaluating the canine's performance.

SIXTH, laboratory analysis of all samples will be carried out by charcoal-strip adsorption elution and capillary column gas chromatography with FID detection. Samples which appear to be negative or questionable will be further tested by solvent extraction of the debris and GC/mass spectrometry where indicated. This is the approach used by most forensic labs in both the public and private sectors.

SEVENTH, the results of the testing will be made known only to the canine handler. Those achieving a passing score (75% or higher) will receive a certification certificate valid for two years (at which time re-testing will be offered at cost). Those who do not achieve a passing score can apply for retesting at some future date.

PHASE 1:
Specificity (Can Test)

A proper testing procedure tests not only their accuracy but the specificity of the canine indication in the presence of typical substrate materials. This test protocol will include several different accelerants on various burned substrates, with blanks, in a manner such as that shown below (Table 2.)

This protocol requires the examination of 20 samples by each canine. The cans will be coded so that neither the candidate nor the test administrator know which cans are positive and which are blanks.

The gasoline used will be 50% evaporated (by volume). All other liquids will be neat (unevaporated). The amount of liquid used in each "positive" sample will produce a concentration of approximately ten parts per million (10ppm) of fuel/air mixture in the can. This involves the use of 10-30ul (10 - 30 microliters) of liquid, placed directly onto the previously burned

Table 2.

	A Carpet/Foam Pad	B Plastic	C Uphol.Fabric/Foam	D Plywood
1.Gasoline	X	X	X	X
2.Kerosene	X			X
3.Diesel Fuel	X			X
4.Cig Lighter Fuel	X		X	
5.Lacquer Thinner	X	X		
6.Acetone	X	X		X
7.Blank	X		X	
8.Blank	X	X		X

debris by means of a micro-syringe.

All substrates will be ignited in a natural gas flame to open-flame (free-burning) state and then put into a can extinguished with the can lid.

The plastic used will be a mixture of polyethylene, polystyrene and polypropylene, the types of plastics found in many environments today.

Canines are to be kept separated during all phases of the test procedure. Handler will advise the evaluators whether the canine is "active" or "passive" alert.

Each team is to have their own set of cans and their own room or area to work, as contact by other canines during the test may invalidate samples. The room or area to work will be checked by the accelerant detection canine prior to the beginning of the test. After the room is checked by the canine, cans containing the samples will be emptied at various locations throughout the room. Samples shall not be placed higher than the canine can reach on hind legs.

Once the accelerants are placed, the room will be allowed to sit for a period of ten minutes to allow air currents surrounding the accelerants to settle. The room will then be examined by the canine handler.

Samples will be removed by the test administrator using clean document forceps from the cans for all tests to minimize distractions, and replaced into the cans immediately after testing. It is recommended that no more than ten samples be out at any one time to minimize evaporation losses. During hot weather, or in heated indoor test sites, no more than five samples should be out at any time. Due to the problems of residual carryover and the number of samples involved, the use of a daisy-wheel testing apparatus should be considered only as a last-resort form of test presentation. Samples will be distributed around the periphery of a room or across a clean concrete slab (indoor or outdoor) with at least five feet between adjacent samples. In either case, the area will be pre-checked by the team being tested in that area.

Once the samples are out, multiple passes (up to four) are permitted at the discretion of the handler, who is responsible for declaring positive or negative alerts at the time of the test. A continuous videotape record will be made of all tests to help in resolving disputes over scoring later and to aid in training future teams.

PHASE 2:
Accuracy (Scene) Testing

Canines are to be kept separate during all phases of this test phase. The handler will advise test administrators whether the canine is active or passive alert. Each team will have their own room to examine, to minimize distractions form other canines. All rooms will be as similar in size and furnishings as practical. The room will be checked prior to burning by the team to be tested in that room. The room will then be ignited using normal combustibles only and allowed to burn near flashover conditions to simulate a realistic scene, and then extinguished with normal water only (No foam or light-water additives). After the room has cooled, the test administrator will place 20 - 30 microliter quantities of each of six target liquids (same as in Phase 1) directly onto burned debris at various locations. Targets will not be placed in locations higher than the dog can reach on hind legs. Once the target liquids are placed, the area will be allowed to sit for a period of ten minutes to allow air currents to stabilize and vapors to settle. A continuous videotape record will be made of all searches to aid in resolving disputes and as an aid in future training. The room will then be examined in any order by the canine team. Multiple passes (up to four) will be allowed at the discretion of the handler, who will be responsible for indicating any alert. The canine will be expected to indicate the specific area intended for sampling. Sampling will be carried out by the test administrator under the direction of the handler, with all samples sealed in clean metal paint cans for laboratory testing. Two comparison samples will be taken by the handler.

APPENDIX 2
Score Sheet

CANINE ACCELERANT DETECTION TEST

NAME_____CANINE_____

CAN NUMBER ALERT RESULTS

Specificity (Can) Test + (Prelim Lab Final

1_____
2_____
3_____
4_____
5_____

6_____
7_____
8_____
9_____
10_____

11_____
12_____
13_____
14_____
15_____

16_____
17_____
18_____
19_____
20_____

Accuracy (Scene) Test

21_____
22_____
23_____
24_____
25_____
26_____

Comparison Sample
Comparison Sample

Alert Method:_____Reward Method:_____

Trained to Detect Which Accelerants:
Gasoline Kerosene Lighter Fluid
Diesel Fuel Acetone Laquer
Thinner

Date:_____ Scorer:_____

Mail, cont'd

when I realized this person was a MAAFS member (Mid-Atlantic) and was the supervisor of a lab whose staff were largely SAFS (Southern Association) members. I was suddenly aware of an advantage that I had over everyone else in the country. As a CAC member, I had my own copy of an internationally-recognized journal that is abstracted and "findable" by almost every literature-search service. If my lab stops subscribing to save a few dollars or the library's copy is lost, I have my own resources on my own office shelf. No one else in any of the other regional organizations can claim such an advantage, even though most (if not all) have useful and informative newsletters. When I realize how little such an advantage costs me (about $3 a month), I can appreciate the foresight of past members who decided to support the Journal as part of everyone's CAC membership.

—John D. DeHaan

Designer, cont'd

are used to make it are not as offensive or dangerous to others. Reportedly, the necessary chemicals can be easily obtained through chemical supply channels and over-the-counter, without the arousing the suspicion associated with methamphetamine production.

Police at several ports of local immigration say that it is likely that we will see additional "designer drugs" as enforcement methods improve. In California, several court cases have been processed that involve drugs that don't quite meet the legal description of drugs that are designated as being illegal, but are dangerous and intoxicating...just the same. Drug trafficers continue to test both the Border Patrol, Customs, and legal systems in a constant attempt to undermine the system and profit from those that would abuse drugs.

—Clark Staten, EMT-P

H&K, cont'd

are just the beginning of the problems. It gets more difficult when one actually views the accidental marks that are responsible for comparing and ultimately matching bullets. The accidental marks on the original issue of the H&K were very fine striae indeed! As a comparison, instead of looking at "rocks" through the microscope, I was now looking at fine sand. I had the feeling that I had to work really hard, very hard to match a Heckler & Koch bullet. Let me make myself clear, I didn't say it was impossible but it does take an Algean Stable type of effort. The base of the bullet is the best place to concentrate your initial efforts. The are where the shallow groove and the gentle hump of a land meet is best. It forms a small triangle that is void of any marks, and the adjacent area has the best marks.

As we received more bullets and shells over the years from the H&K, we noticed the very fine striae on the bullets have become more coarse and consequently easier to identify. I have two theories on this more pronounced marking of the bullets. First, the guns have had many hundreds of rounds through them and the barrels are wearing. Second, the later batch of H&K's we received at the State Police had a slightly rougher barrel, making identification easier. We never kept track of serial numbers to determine which theory would be more credible. Even as the bullet became somewhat easier to look at, the shell still stayed at the same difficulty level.

We were the first in the world to concentrate microscopically on this particular firearm. We methodically and scientifically determined what had identification value and what did not. I feel that our examiners at the New Jersey State Police Ballistics Labs are without a doubt the best in the field. I feel proud that I was once part of that segment of the Special and Technical Services Section. We worked very hard at achieving good results with the Heckler and Koch pistol.

Lt. Leisinger is Lab Director for the NJSP East Regional Lab in Sea Girt.

We Stand Corrected

In the article "Is it Gasoline or Insecticide", The *CACNews*, Spring 1994, we erroneously added plus (+) signs to the right side of Fig.1. These should be deleted. Also, Reference 2 should read, "...Forensic Science Document E1387..." The CACNews regrets the error.

Insider Information

Births

Orange Co.SO- Patrick Morgan, Feb 5, 1994. Son of **Debbie** & **Ted Eck**.

Marriages

Los Angeles Police Dept- Criminalist **Susan Johnson** Married Rich Brockbank

Promotions

Orange Co. SO- **Dick Lohnson**-Senior Criminalist to Chief Criminalist, **Bruce Houlihan**- Senior Criminalist to Chief Criminalist, **Tina Chan**- Senior Criminalist to Supervisor, **John Hartman** - Senior Criminalist to Supervisor

Los Angeles Police Dept:
Susan (Johnson) Brockbank from Crim II to Crim III (Trace Unit lead), **Ron Raquel** from Crim II to Crim III (Field Unit lead), **Larry Blanton** from Crim II to Crim III (Serology Unit lead), **Alison Ochiae** from Crim II to Crim III (QA/QC Manager), **Joe Hourigan** from Crim II to Crim III (Alcohol Analysis Unit lead), **Lennard Henkhaus** from Crim II to Crim III (Special Testing Unit lead), **Bill Moore** from Crim II to Crim III (Narcotics Unit lead), **Dennis Fung** from Crim II to Crim III (Firearms Analysis Unit lead), **Jason Wasserman** from Crim II to Crim III (Valley Unit lead)

Transfers

Contra Costa County SO: **Paul Holes** - Forensic Toxicologist to Criminalist I

Retirements

Orange County SO-**Carole Sidebotham**, after 24 years of service

Resignations

Contra Costa County SO: **Susan Swarner** accepted a position as a DNA analyst with the Armed Forces Institute of Pathology in Rockville MD

New Hires

Los Angeles Police Dept:
Jon Babicka - Narcotics Unit
Kurt Spies - Narcotics Unit
Andrea Mazzola - Toxicology Unit
Chris Hargens - Toxicology Unit
Mike Mastrocovo - Serology Unit

Solutions

A mathematician and a physicist were asked the following question: Suppose you walked by a burning house and saw a hydrant and a hose not connected to the hydrant. What would you do? Physicist: I would attach the hose to the hydrant, turn on the water and put out the fire. Mathematician: I would do the same.

Then they were asked this question: Suppose you walked by a house and saw a hose connected to a hydrant. What would you do? P:I would keep walking, as there is no problem to solve. M: I would disconnect the hose from the hydrant and set the house on fire, reducing the problem to a previously solved form.

This may be of interest only to history buffs and fans of old crimes, but here is the poster for the play the very night President Lincoln was shot.

AMERICA ONLINE


AMERICA ONLINE

"YOUR DRUG TEST SHOWS YOU TO TEST POSITIVE FOR EYES OF NEWT."


AMERICA ONLINE

"SUSAN, THIS IS MY LAWYER. HE GOES WITH ME EVERYWHERE IN CASE I HAVE TO SUE SOMEONE."

COMPUSERVE

1994 CAC FALL S·E·M·I·N·A·R

Forensic Science Society · California Association of Criminalists · Joint Meeting · Co-hosted by: Los Angeles County Coroner's Lab and Los Angeles County Sheriff's Lab · Pasadena Holiday Inn · October 19, 20 & 21 · For more information, contact Program Chair Manuel Muñoz at (213) 974-7086

CAC/FSS joint meeting