

The President's Desk



California has had a leadership in the education of criminalists that is being threatened by the recession.

Criminalistics education in California started back in the early 1920's at U.C. Berkeley. Starting with Vollmer and Heinrich, thru the "Golden Era" of Kirk, and now

with Sensabaugh and Thornton, the University has been the leader in teaching Criminalists offering Bachelor (now defunct), Masters and Doctorate degrees. The State University System has also had a history of Criminalistics education in Los Angeles (Lee, Pinker, Morton, Cadman, and Longhetti), which gives a Master's Degree and in Sacramento (Roche, Parker, Haq, and Cashman) which has a Bachelor Program, the Masters Program has already been abandoned. There may have been other programs that I am overlooking (Long Beach for a while), but these three are the ones that produced most of the forensic science degrees in California.

Except for CSUS, where all four worked at one time, these programs have been run by one or two professors. These educators have worked hard and have turned out a number of the leaders in forensic science throughout the nation. California has a right to be proud of the educational process that has contributed so much to this field.

However, the Criminalists Education in California is being threatened. The budgetary problems of UC and the State Universities are causing attrition to eliminate the professors at these institutions. Sacramento State has gone from a staff of four to a staff of one and he may retire soon. The program is being changed to a minor. At UC, John Thornton is retiring next July. Unless the University decides to refill the position, there will be only one full time person left in Northern California teaching Criminalistics.

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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. The acceptance of any advertisement is at the sole discretion of the Editorial Secretary.

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. can also be placed into articles. Please contact the Editorial Secretary for details. FAX submissions are also acceptable. The FAX number for the Editorial Sceretary is (408) 298-7501.

The deadlines for submissions to The CAC News are: December 15, March 15, June 15 and September 15.

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Northwest Association of Forensic Scientists April 26 - 29, 1994

The Spring 1994 Meeting of the NWAFS will be held at the Concord Hilton in Concord, California. The main event of the four day gathering will be a one-day plenary session on Thursday, April 28th dealing with the management of mass disaster crime scenes. The speakers for this session are all veteran crime scene investigators who will speak about their man-

agement of three mass disaster crime scenes. Featured speakers will discuss the Oakland Hills fire, shootings at 101 California Street and World Trade Center bombing. Technical papers will be presented on Friday morning, April 29th. The NWAFS is also sponsoring several technical workshops on the following topics: Arson Detection sponsored by ATF, Polaroid Photography, Infrared Spectroscopy Interpretation, Wildlife Forensics and Toxicology. For further information, please contact: Roger A. Ely, DEA Western Laboratory, 390 Main Street, Room 700, San Francisco, CA 94520, (415) 744-7051 ext 29.

California Association of Criminalists May 11 - 14, 1994

The 83rd Semi-Annual Meeting of the CAC will be held at the Oakland Hilton in Oakland, California. This will also celebrate the 50th Anniversary of the Oakland Police Department Criminalistics Laboratory. Room rates are a very attractive \$79.00 single or double occupancy. The hotel offers free parking to attendees and free shuttle service to the nearby Oakland International Airport. Two workshops are planned for Wednesday, May 11th in FTIR Spectroscopy and Court Room Testimony. A third workshop is in the planning stages. Plenary Sessions will be held Thursday, Friday morning and Saturday morning. The American Board of Criminalistics (ABC) General Knowledge Examination will be offered on Saturday. Specialty tests may be of-

Jobs Offered

SUPERVISING CRIMINALIST

The Santa Clara County Crime Laboratory is currently recruiting qualified applicants for the position of Supervising Criminalist. Vacancies are in the laboratory's Serology/DNA unit and Comparative Evidence/Chemistry unit. The effective salary range is \$56,308 -\$68,450 per year and requires a minimum of five years of experience. Applicants who are interested in these positions, please contact: Benny Del Re at (408) 299-2220, Santa Clara County Crime Laboratory, 1557 Berger Drive, Room B-2, San Jose, CA 95112.

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FORENSIC SPECIALIST/ LEAD FORENSIC SPECIALIST

The Orange County Sheriff's De-

partment is seeking applicants for the position of Forensic Specialist/Lead Forensic Specialist. Qualifications for Forensic Specialist include general knowledge of crime scene investigation, including photography, physical evidence recognition and latent print development techniques. Qualifications for Lead Forensic Specialist include thorough knowledge of crime scene investigation, physical evidence, photography, latent print development techniques (manual and chemical) and three years experience as a latent print examiner. Salary range: Forensic Specialist \$2156-\$2886 and Lead Forensic Specialist \$2733-\$3687. Applicants who are interested in these positions please contact: Maggie Black, Supervising Forensic Specialist, Orange County Sheriff Forensic Science Services, 320 N. Flower, Santa Ana, CA 92703, (703) 834-4525.

fered as well. For further information, please contact: Rosemary Laird, Oakland Police Department, 455 7th Street, Room 608, Oakland, CA 94607, (510) 238-3386.

Investigation of Crime: Crime Scenes, Computers and Children May 12 - 14, 1994

The Bi-Annual Seminar of the Investigation of Crime is designed for both the new and more experienced officer and detective. The course explores basic techniques, new concepts and the equipment used in investigation. The May 1994 course will present lectures in the latest use of computers in crime scene investigation and age enhancement. In addition, there will be formal presentations and practical exercises in child and adult crime scene processing. For further information, please contact: Karen Griest, MD, 160 Washington SE #234, Albuquerque, New Mexico 87018, (505) 281-8109.

2nd International Meeting on Clinical and Forensic Aspects of Hair Analysis June 6 - 8, 1994

Genova, Italy

For further information, please contact: Dr. Mario Cassani, Laboratory of Biochemical Chemistry, Ospedale Ca Grande, Plazza Ospedale Maggiore 3, 20162 Milano, Italy, FAX (39)-264.44.29.01.

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, Florida. 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.

ANNOUNCEMENTS cont'd on Page 22

The following study was presented at a 1986 poster session of the Association of Analytical Chemists in Scottsdale, by George P. Hoskin, PhD, Senior Scientist, USFDA.

Identification of Mammalian Feces by Coprostanol TLC: Collaborative Study

Mammalian feces contain coprostanol (5-beta-cholestan-3-beta-ol), which is formed by intestinal flora in mammals through the derivitization of cholesterol. It has been used previously as an indicator of the effectiveness of sewage treatment. It is very stable and persists as long as the sample has not been previously extracted with a non-polar solvent (e.g. hexane). The compound is not species specific, and is related to the diet and health of the animal producing the sample. Plant sterols do not seem to interfere with this TLC method, however confirmation by GC or GC/MS is recommended.

In this study seven collaborators each tested 45 unknown samples by a TLC method which uses coprostanol as an indicator of feces. The samples tested were five replicates each of three sample sizes (0.5mg, 1.0mg and 5.0mg) of cockroach excreta (negative), cow and rat feces (both positive). Of 315 samples tested, 261 (82.9%) were correctly identified; there were five false positives, 26 false negatives, and from one collaborator, 23 inconclusive results.

Method: Prepare a silica plate such as Whatman LK-6D by dipping it into a solution of fresh 5% phosphomolybdic acid (PMA) in 95% ethanol. The PMA may need to be filtered to remove insoluble particles. Do not allow the plate to touch metal after the coating (use glass or plastic utensils). Dip the plate up to but not including the sample line (about 3cm from the origin).

Extract the sample in hexane (about 10ul/mg, minimum 30ul) and let stand one hour. Spot 20ul of the hexane solu-

tion onto the plate and place into a tank with 45:55 heptane:ether. Let stand for about 20 minutes at 120 deg. C. and examine. Also run standards and controls.

Confirmation may be carried out by GC using SP 2100 packing and a temperature programmed run from 190 to 260 deg. C, at 5 deg. per minute, then held for 11 minutes. The sample elutes around 14 minutes.

How Much Is Your Squirt Bottle of Bleach Worth?

No, this is not a question for "*The Price is Right*", it is a question about compliance with the state and federal OSHA Hazard Communication Standard. According to well informed sources, the current fine for an improperly labeled container in the work environment is \$125.00 per container!

Cal OSHA paid an unannounced compliance visit to a local medical diagnostics manufacturer on July 15 and found one inadequately labeled container. The fine was \$125, no discussion! (How much is *your* bench worth? —see below).

What is a "proper" label? The contents of the container must be clearly defined. If there are any hazardous components in the solution (e.g. bleach, azide, alcohol or other poisons), they must be identified by approximate percentage. If there are hazardous components in the solution, the appropriate warnings (gloves, lab coat, "poison", "handle only in hood", etc.) must be on the label. The container should be dated, and the name of the generator (not initials!!) clearly legible.

Please check your work area today and be certain that *every* container is properly labeled. The only containers which are exempt are beakers or cylinders which are being used exclusively that day. Any solutions in closed bottles, carboys, etc. must be properly labeled.



—Mary Sigourney Reprinted with permission from "The Early Edition", an inhouse newsletter of Microgenics Corp.



McCrone

•Synthetic and Natural Fibers• Advanced Microscopy Workshop January 31 — February 4, 1994 Hayward Classroom Forensic Analytical Specialties 377 Depot Rd. Hayward, CA \$250 CAC Members (Endowment Supplement) \$650 Non-members (MRI Forensic Scientist reduced rate) Contact Nancy Daerr, MRI (312) 842-7100

CAC

•Forensic Paint Examination• March 21-25, 1994

Instructor, Scott Ryland

(Florida Dept. of Law Enforcement) Topics Include: Basic paint chemistry, types of paint evidence, analytical methods, significance of paint, no-suspect hit/runs. Practical, hands-on sessions include paint binder classifications given FT-IR spectra, sample characterization using stereomicroscopy and basic microsolubility/microchemical tests, sample preparation for FT-IR and SEM/ EDX.

Orange County Sheriff-Coroner Forensic Science Services Building 320 Flower St. Santa Ana Enrollment limited to fifteen. \$130 CAC members \$300 non-members. Contact Liz Thompson for info/course outline (714) 834-6336



Editor's Mailbox



The opinions expressed in "The Editor's Mailbox" are solely those of the contributor, and do not necessarily reflect those of *The CACNews* or its advertisers.

Shark Bait

To the Editor:

In casual conversation with a former CAC board member, I was shocked to find out that the Board of Directors currently has no Director's and Officer's liability insurance, or "D&O." With so much to lose, don't you think it irresponsible to provide so little protection for our rather plump endowment fund. I was told that "We looked into it, but it was quite expensive ... " O.K., but we give thousands away every year in grants for training and research, I really think some should be spent protecting what we already have. Uncovered assets are just like so much chum in the water ...

-J.Houde, Ventura

Open Letter

To the Editor and the Membership:

At the last Semi-annual Seminar, I displayed a slide at the end of my paper, which was intended for humor. It has been pointed out to me that this slide was totally inappropriate under the circumstances. In retrospect, I must agree with the comments that I have received in this regard. I had absolutely no intention of offending any member of the association, and I deeply regret that I did so. I wish to convey my sincere apologies for this action.

-V. Parker Bell



Ron Nichols '93 Kirk Award Winner

The CAC Awards Committee is pleased to announce Ron Nichols as the recipient of the 1993 Paul Kirk Award. This award is intended to acknowledge outstanding individuals who have been in the Criminalistics profession for fewer than five years.

Ron received his Bachelor of Science degree in Criminalistics from the State University College of New York at Buffalo in 1984. He spent five years at the Contra Costa County Criminalistics Laboratory, starting off as a Forensic Technologist, and later being promoted to the position of Forensic Toxicologist. In 1989, Ron was hired as a Criminalist with the Oakland Police Department, where, within a period of seven months, he was given supervisory responsibility over the their busy controlled substances section. While he continues to maintain his duties in the controlled substances section, Ron's interest and initiative led him through formal training in firearms and toolmark examination. Within two years, Ron was conducting independent casework examinations in this area. Ron has also been a very active member of the CAC Northern Firearms Study Group and has given presentations to the CAC in the area of firearms analysis. To further broaden his knowledge Ron has since trained some of his attention on the area of trace evidence examination.

Through his interest and ingenuity, Ron has made significant contributions to his laboratory, the CAC, and to the Profession.The Awards Committee feels is very deserving of this honor. Congratulations Ron!

-Ben Smith



CAC Founder's Lecture - October 1991



Reflections of a First Generation Criminalist

-James W. Osterburg

In the first Founder's Lecture of the California Association of Criminalists (CAC), Jack Cadman described the beginnings of *Criminalistics* on the west coast.(1) As a kind of sequel to Jack's graphic account, I would like to offer my own perspective of those beginnings on the east coast — a perspective gained from a decade of experience in New York's crime laboratory (1942—1952), and from twenty-five years of teaching in departments of criminal justice (1960—1985).

Criminalistics was indeed in its rudimentary stages in the days when I worked in New York's Technical Research Laboratory with Charles E. O'Hara as my partner. Most of its staff were sworn members of the police force, and assignment to the laboratory was achieved through "clout". In on-the-job parlance this meant knowing someone "upstairs" in the police hierarchy. We were "rookies" and unaware of this reality, of course. As a consequence, we felt considerable disappointment when applications for transfer to the crime laboratory, then under the command of the police academy, went nowhere. Our lucky break would come because its commander happened to be the only one of eight deputy chiefs who anticipated America's entry into WWII — a man who immediately acted on the realization that the city would require a civil defense plan. The chief, (John J. O'Connell, co-author with Harry Söderman of "Modern Criminal Investigation"), having heard that O'Hara had writing experience and a physics laboratory manual to his credit, immediately put him to work designing and implementing a plan for New York City.

My own lucky break resulted from my close association with O'Hara during our months together as police recruits; thus, O'Hara's call for my help with his assignment. *Plans for Civil Defense* was the first of the five manuals we would write before our boss was promoted to chief inspector. Himself an old-time detective, O'Connell's first move was to put the crime laboratory in the detective division; ours would be to invoke the new-found clout with him by requesting that much-desired transfer. Now in the laboratory, we were surprised to find that

virtually none of its personnel had earned college degrees. They were certainly not scientists, yet through an apprenticeship to such colleagues we were to learn the "tricks of the trade." Even more discouraging was the limited number of books purporting to describe what forensic science (or particular aspects of it) was all about.

Only two texts proved to be of any substantive value in our work(2,3); the rest are worthy of mention purely for historical reasons(4-8). The state of knowledge that governed the scientific



Please turn to page 18

Northern

DNA STUDY GROUP

Section Report

Chairs: Sue Swarner, Contra Costa Co and Jennifer S. Mihalovich, FSA The DNA Study Group met on October 7, 1993 at the DOJ-DNA Lab

in Berkeley. Jan Bashinski discussed papers presented at the recent Promega Meeting in Scottsdale, Arizona. The meeting was held between 11:00 am and 2:30 pm and pizza was purchased for lunch. The majority of the attendees preferred having the meeting during the late morning, early afternoon hours. We will continue to schedule meetings at this time.

FIREARMS STUDY GROUP

Chair: Lansing Lee, Oakland Police Dept

The Firearms Study Group met on July 15, 1993 in conjunction with the CAC dinner meeting (see The CAC News, Fall 1993). The group discussed the 1993 AFTE Meeting held in North Carolina. An offer was made to make available, negatives to the OPD breech face cartridge casing color photograph album in exchange for ten sets of test fired cartridge casings and Mikrosil breech face casts. At the present time there are in excess of 100 firearms represented. Interested parties should contact Ron Nichols at Oakland Police Dept. Ron is working very hard on this project and would like more input from other interested analysts.



A CAC Southern Section Dinner Meeting was held on August 26, 1993, hosted by Barbara Johnson (LASD) at the Gold Star Restaurant in Whittier. After a tour of the Arson Explosives Detail at the Sheriff's Academy, Deputies Ablott and Edwards spoke on Managing Major Bomb Scenes and the New York Trade Center Bombing.

SEROLOGY STUDY GROUP

Chairs: David Hong, LASD and Dean Gialamas, Cal Lab

The Serology Study Group met on August 26, 1993 prior to the dinner meeting. Elizabeth Devine and Catherine Navetta (LASD) gave a "Back to Basics" lecture on Gc Subtyping. Also there was a review of PGM protocols.

DNA STUDY GROUP

Chairs: Rob Keister, OCSD and Erin Riley, LAPD

The DNA Study Group met on August 26, 1993 prior to the dinner meeting. John Hartmann (OCSD) reviewed TWGDAM Meeting. Barbara Johnson (LASD) reviewed CCI PCR course. Jan Bashinski (DOJ) led discussion on what probes/markers should be included in the database for use by CODIS. Also a sample exchange for D1S80 for typing by OCSD.

DRUG STUDY GROUP

Chairs: Lisa Winters and John Davis, OCSD The Drug Study Group met on August 26, 1993 prior to the dinner meeting. Attendees participated in a roundtable discussion of interesting cases.

TRACE STUDY GROUP

Chairs: Lynne Herold, LASD; Jeff Thompson, HBPD and Wayne Moorehead, OCSD

The Trace Study Group met on August 26, 1993 prior to the dinner meeting. Jim Bailey (LASD) reviewed InterMicro 1993. Attendees participated in a case presentation roundtable.

TOXICOLOGY STUDY GROUP

Chair: Manuel Munoz, LA Coroner

The Toxicology Study Group met on August 26, 1993 prior to the dinner meeting. Attendees joined the Drug Study Group in a roundtable discussion of interesting cases.

BLOOD ALCOHOL STUDY GROUP

Chair: Dan Nathan, LASD

The Blood Alcohol Study Group met on August 26, 1993 prior to the dinner meeting. Topics of discussion included: rebuttals to recent defense expert testimony, congeners and their effects on breath instruments, the "inhaler defense", *Kelly-Frye* and nystagmus - change in the rules, and the impact of losing Dr. Morales after 20 years of "guidance" from DoHS.



INSIDE Information

Births

Los Angeles SD: Criminalist Gisele LaVigne, Baby Mark James — 10-3-93; *LA Co Coroner:* Senior Criminalist Lai Chua, Baby Alexander 7-17-93; *San Diego SO:* Jim Mudge, Baby Cassandra 12-24-93; *Orange Co SD:* Nathan and Mel Cross, Baby Mallory 11-16-93

Weddings

LASO: 8-28-93 Erin A'Hearn and Gil Trujillo; Orange County SO: 9-11-93 Tom Matsuhaira and Donna Kai — Honeymooned in Florida and the Bahamas.

Transfers

From LASO to Orange County: Student Workers to Criminalists Joe Jaing and Greg Wong; LAPD: Capt. Leach replaces Capt. Bonneau as SID Commanding Officer

Promotions

DOJ Santa Barbara: David Barber and Charlene Marie from Criminalist Range C to Senior Criminalists. Effective 1-94; Ventura SO: John Houde and Mike Parigian from Criminalist III to Senior Criminalists; Huntington Beach: Sly Arsovski from Criminalist to Senior Criminalist.

Resignations

San Diego PD: Latent Prints Scott Peters - to work for the Postal Service in Dulles Virginia; Latent Prints: Dianne Donnelly- to work for the Indianapolis, Indiana State Lab; Evidence Technician Debbie Burger to become a San Diego PD police officer. Los Angeles PD: Criminalist Lydia Green to attend USC Medical School; Supervising Criminalist Bill Lewellen to work as a criminalist for San Mateo Co SD. San Diego SO: Criminalist Walter Fung resigned to become a pastor in an inner city school in Jersey City, NJ.

Retirements

Los Angeles PD: Chief Forensic Criminalist **Rick Bingle** retired after 32 years as a criminalist with the LAPD

Welcome Aboard

Orange County SD: New criminalists: Robert Bunney, Ruth Ikeda, Joseph Jaing, Scott Munroe and Gregory Wong; Los Angeles PD: New criminalists: Lisa Flaherty, Jon Babicka, Andrea Muzzola and Kurt Spies

"Misc" Information

Softball Tournament on December 4 LASD SSB went 3-0 vs. DOJ-Riverside, Huntington Beach, Cal Lab, and OCSD. Good Going "Bad-Boys"!; San Diego PD is merging their DNA (PCR-DQa) and conventional serology programs into a Biology Unit; San Diego PD has received 2 grants for purchasing equipment for the latent prints and Questioned Documents Units. Both grants are from the Legler Benbough Foundation and will be used for various image enhancement and graphics manipulation equipment. Ventura Co SO civilianized their evidence collection unit, hiring four evidence technicians replacing the sworn personnel that have staffed the unit since its inception.



- Training & Resources

SEROLOGY

Back to Basics Series: • 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 Yamaguchi

- 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

I · ABC News 9/23/91: "Lab Errors"

TAPE 1: 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:

Carol L. Hunter, T&R Chairperson Cal Lab of Forensic Science 17842 Irvine Blvd. Suite 224 Tustin, CA 92680



One hundred-nineteen microfossils were arranged with the aid of a 10X stereo-microscope and some double-sided tape to make this issue's title. A few of the more clearly visible microfossils are named here. These fossils were collected from the Rincon hill, about a mile north of the Ventura-Santa Barbara County line, along the 101 freeway.

I have been collecting large fossils and microfossils from this site for about seven years. This de-

posit is part of the Santa Barbara Formation, and is lower Pleistocene in geologic age or approximately 1 million years old. The title took me about two hours to arrange, but the real time involved is much longer because I spend many hours searching and sorting raw material. I keep the microfossils in black 35mm film cannister lids for sorting and arranging, because they stack up neatly and can be stored in a parts cabinet drawer.

Reproduced actual size

-Ed Jones

<u>Treasurer's Report</u> Endowment Fund Update

At the October Board of Director's meeting approximately \$28,000 from the proceeds of the A. Reed and Virginia McLaughlin Endowment Fund investments were allocated for the following approved projects.

 Training and Resources Committee recommended training classes. (Formal announcements to follow).

 A. Paint and Polymer Analysis. FT-IR and SEM/EDX
Instructor: Scott Ryland (Florida DLE).
Time: Spring 1994 Location: OCSD
Funding: 50% tuition for members

B. McCrone Advanced Microscopy. Synthetic/ Natural Fibers Instructor: McCrone Research Time Spring 1994 (uncertain) Location: Hayward Funding: Tuition reduced (\$400) for members C. Time and Stress Management Workshops Instructors: TBA

Time/Location: In place of North/South Study Groups To be determined by Regional Directors and T&R.

Funding: Free to members

D. Courtroom Presentation of Evidence Abbreviated version of CCI class (1 day) Instructors: Ray Davis & Richard Konieczka Time/Location: Spring Seminar (Oakland) Funding: Reduced workshop fee for members

II. Other funding

A. Bob Bourhill, Oregon Dept. of Forestry Project: Cigarette Identification Aid Funding: Printing costs Comments: Copies free to CAC Labs— No longer funded by Oregon.

B. Ann Challed, CSULA
Project: PCR application to botanicals
Funding: Supplies and equipment
Comments: Master's project, equipment to
revert to CAL State

C. Don Jones, SBSO/CSUSB Project: Linkage relationships between DQalpha and D1S80 loci and conventional protein markers. Funding: Supplies Comments: Master's project

D. Pam Sartori, OPD/CSULA
Project: DQalpha and D1S80 gene frequencies of a California Chinese
population.
Funding: Supplies
Comments: Master's project

E. UC Berkeley, Forensic Science Program Funding: Scholarship funds

Also, the BOD, at the same meeting, voted themselves the ability to "pre-approve" funding for workshops and other training related to upcoming seminars which otherwise would have difficulty meeting the time constraints of the Endowment funding process.

—Jim White

10

The Persistence of Fingernail Striae with the Passage of Time and Injury

-L.C. Haag*

Abstract

The undersides of human fingernails possess unique striation patterns that represent toolmarks in a biological system. In cases where a broken, severed or trimmed fingernail is recovered from a crime scene, such evidence can be specifically associated with the source of the nail many months to even years later due to the persistence of these striae patterns with the continued growth of the nail and their resistance to injury. With proper preparation of the questioned sample and the known clippings of the donor's fingernails, the toolmark examiner will be presented with a degree of correspondence seldom seen in other striated toolmarks.

Introduction

The first known mention in the American literature of the potential for the specific identification of individuals based on the striation patterns on the undersides of fingernails was by the late John Davis (1943)- criminalist and former laboratory director of the Oakland, California Police Crime Laboratory. At the time of his 1943 observations he was an identification technician with the Missouri State Highway Patrol. He reported and illustrated a toolmark match between the longitudinal striations on the undersides of his own thumbnails collected 16 months apart.

The first known reported use of fingernail striae in a court case as a unique toolmark representing a means of personal identification in the English language literature was that of Roche (1957). Dr. Roche— the Senior Pathologist in Charge of the Forensic Science Laboratory in Oshodi, Nigeria, gave testimony in a fraud case (Regina v. Marcus Adeshote) regarding the complete agreement in striae patterns between an evidence nail clipping and an exemplar clipping. One of his associates and coworkers (DWA Peters) who prepared the photomicrographs in the Adeshote case ultimately studied and intercompared the fingernail striae patterns of 37 subjects and found no match between them. He also studied the persistence of fingernail striae out to 6 vears. Thomas and Baert (1965 and 1967) republished the report of Roche in more accessible journals which are described in the reference section to this article.

Several American forensic scientists—Bisbing (1980) and Stone (1981 and 1984) have published the results of positive comparisons from actual casework and in Stone's second 1984 article he gives well articulated scientific and legal arguments for the admissibility of such evidence.

In 1991 a fingernail striae symposium was held in Houston, Texas in conjunction with the Association of Firearm and Toolmark Examiners annual seminar. The panel members for this symposium included forensic scientists from the German BKA laboratory (H Katterwe) and the Finnish Central Criminal Police Laboratory (H Majamaa) and a number of American forensic scientists who had carried out various studies on the subject and/or had been involved in actual casework involving fingernail comparisons. After a thorough review of the origin and nature of these striated marks, their persistence over time, techniques for preparing and comparing these striae patterns, reports of studies on documented identical twins, and other case reports, a position paper was drafted, presented and accepted. This position statement (still in preparation by A.F.T.E.) will state something to the effect that- the striated patterns on the underside of human fingernails and toenails represent a unique toolmark laid down over time in a biological matrix. these striated patterns are the result of the slow extrusion of the keratinaceous nail material over the irregular surface of the nail bed. The

irregularities in the nail bed arise from the same sort of structures that produce the friction ridges on the fingers and toes of humans, and are well known and long utilized as a means of individual identification. Consequently the striated patterns on a severed fingernail or toenail can be compared and specifically associated with the original source of that fingernail or toenail by the customary technique of striated toolmark comparison. Additionally it should be recognized that the forensic scientist most qualified and suited to examine, compare and testify regarding the correspondence of such marks are those involved in toolmark comparisons. That these striated patterns are indeed unique toolmarks that happen to occur in a biological matrix does not necessitate the testimony of medical practitioners any more than the examination and identification of fingerprints requires the comment of a dermatologist.

Aside from a brief historical overview, the purpose of this writer's presentation is to illustrate the compelling nature of these unusual toolmarks, their persistence with the continued extrusion of nail material in living individuals over substantial periods of times (e.g. years) and their resistance to change from injury.

Procedure

In 1985 a member of the California Association of Criminalists (Reed McLaughlin-now deceased) provided the author with his personal collection of fingernail clippings for all 10 of his fingers covering a 13 year time span. A detailed history of trauma, chemical treatments and general health problems of the donor during this time period was also provided. The striae on the underside of selected members of this collection were cast with a silicon rubber material (Mikrosil) after cleaning and preparation of each nail and the casting compared with the forensic comparison microscope. Very good nail striae patterns were matched out to 12.5 years. This is in good agreement with the experience of other authors and exam-

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iners who successfully matched samples over many years of growth in living individuals.

In the Summer of 1992 this writer sustained an injury to his right index finger of sufficient force to cause hemorrhaging under the nail and ultimately led to the loss (exfoliation) of the old nail after about 3 months of new growth. Since the force of this injury was delivered to the base of the nail (the region where the keratin cells forming the fingernail are laid down and slowly extruded), the pattern of striae on the underside of the new nail stood to be altered. Six months later a full replacement nail had grown in. Although some changes could be found in the central area of the new nail, good matching of striae could still be found at the two edges which permitted an easy identification between the pre-injury and the post-injury nail.

Summary

The striae patterns on the undersides of human finger and toenails represent a unique striated toolmark. These toolmarks are not only unique but persist over time and are remarkably resistant to change due to injury.

The character and degree of correspondence between samples from the same finger collected weeks, months, even years apart typically far exceed that seen in other more common toolmarks produced by prybars and scraping tools against relatively soft metal surfaces.

Barring significant injuries to the nail bed, these same striated patterns can also be used to exclude an individual as the source of a fingernail clipping of fragment.

Finally, the only thing truly unusual about fingernail striae matching is the infrequent recognition and collection of fingernail fragments at crime scenes and their subsequent submission to the criminalistics laboratory for comparison.

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Fig. 1 The injured finger and nail one month after sustaining a crushing injury at the base of the nail.

Fig. 2 The injured nail after two months of growth.





Fig. 3

The injured nail after 2.5 months. Note that the "old" nail is starting to exfoliate and the new, underlying replacement nail can be seen adjacent to the cuticle.

Fig. 4 The injured nail about to separate at the end of three months regrowth and extrusion of a new nail





Fig. 5 The new replacement nail at four months.

Fig. 6

Two juxtaposed views of Mikrosil casts of the underside of the same fingernail clipping before and after removal of the adhering cellular debris. This illustrates the critical importance of removing these cellular materials in order to view the underlying striae pattern.





Fig. 7

The comparison of one edge of the old (injured) nail vs. the same area on the new, regrown nail using Mikrosil to replicate the striae patterns. [Magnification approx. 20X via the comparison microscope.]

Fig. 8

A comparison microscope view of the opposite edge of the injured nail vs. the new nail showing matching striae despite the substantial injury to the finger between the extrusion of these two nails.





Fig. 9

An actual case example from *Commonwealth of Virginia v. Cotton*, of a questioned nail and a known nail. The torn nail (above) was recovered from a crime scene and the comparison nail (below) was taken from the suspect months after the incident. These nails were coated with gold, viewed and photographed directly through the comparison microscope by Ann Jones of the Central Crime Laboratory in Richmond, VA. She subsequently testified in this case and rendered her opinion as to a common source for these nails, based on the matching striae pattern.



A tour of the aircraft carrier USS Constellation was the highlight of the 83rd semi-annual meeting of the CAC, many attendees agreed. Seminar organizers Marty Fink and Randy Robinson, both of San Diego S.O., along with NIS Lab Director Brandon Armstrong arranged the tour. About 70 people attended the meeting, which included several special events in addition to the ship's tour, such as a luxurious lunch aboard a paddlewheel boat.

Other highlights included one of the first specialty examinations given by the newly-formed American Board of Criminalistics, with about 20 persons sitting for the test. The CAC business meeting was spiced up with vigorous dis-

Fall 1993 CAC Seminar

USS Constellation Tour Highlights Meeting









cussions regarding the merits of continuing the CAC's own certification process, and whether or not to discontinue the Journal of the Forensic Science Society. (Please see the official minutes for a detailed report).

Over the course of the three-day affair, many informative papers were presented, a few with active audience participation: Dean Gialamas, et al, brought along an accelerantsniffing dog, who demonstrated its abilities in finding some gasoline secretly dripped on a audience member's shoes. (See photo). And Robert Blackledge gave his well-researched paper, "The Identification of Condom Lubricant Traces on Evidence Items From Sexual Assaults", which was published in the Fall 1993 issue of *The CAC News*.

















In May of 1991, DOJ Criminalist Jay Mark spoke to the Central Valley Chapter of Calif. Association for Property and Evidence. In his remarks, Jay pointed out that cocaine had been designated an "extremely hazardous waste" by the Dept. of Health Services. As such, it needed to be handled in a very specific manner; law enforcement could no longer incinerate it or bury it. Following is some food for thought for those who love esoteric biochemistry: the use of microbial agents to render hazardous waste harmless.

SITE Program Evaluates Emerging Technologies

The ETP (Emerging Technology Program) provides a framework for pilot-scale testing and evaluation of technologies that have proven to be effective at conceptual or bench scale. Technology developers are solicited yearly for the program, and projects are considered for either a 1- or 2-year developmental effort. Projects are funded through cooperative agreements between EPA and the technology developers, with as much as \$150,000 in EPA funding available per year for each project. After development under the ETP, emerging technologies may be considered for projects under the SITE Demonstration Program.

The ETP actively solicits biological treatment technology developers in requests for pre-proposals and has received an increasing number of preproposals for biological technologies each year since the program began in 1987. Currently, 13 biological technologies have been accepted into the ETP, and 4 bioremediation projects have been completed. A brief discussion of each of the completed projects follows.

Biological Sorption

In fall of 1989, a biological sorption process that uses algae to remove heavy metal ions from aqueous solutions was tested under the ETP on mercury-contaminated ground water at a hazardous waste site in Oakland, California. The sorption medium used in this process consists of algal cells immobilized in a silica gel polymer. This medium functions as a biological ion exchange resin that binds both metallic cations and metallic oxoanions. After the matrix is saturated, the metals are stripped from the algae with acids, bases, or other suitable reagents. Testing at the Oakland site was designed to determine optimum flow rates, binding capacities, and the efficiency of stripping agents. Based on the results of this project, the sorption technology was recommended for a project under the SITE Demonstration Program.

Methanotrophic Bioreactor System

A bioreactor system that uses methanotrophic bacteria to co-metabolize aqueous-phase halogenated aliphatic compounds, such as trichloroethylene (TCE), was tested at bench and pilot scale under the ETP from 1990 to 1992. The bacteria used in the reactor produce a soluble form of the enzyme methane monooxygenase (MMO), which rapidly degrades TCE and related compounds. Unlike many other microbial species, the methanotrophic bacteria degrade TCE without generating hazardous intermediate products. Bench-scale tests were conducted on a continuous, dispersed-growth, model of the reactor during the technology's first year in the ETP. Pilot-scale testing conducted during the second year demonstrated the full-scale feasibility of the reactor.

Fluid Extraction/Bioremediation System

A fluid extraction/bioremediation system that remediates organic contaminants in soil was accepted into the ETP in June 1990. This system combines three distinct processes: (1) fluid extraction, which removes organics from contaminated soil; (2) separation, which transfers the pollutants from the extract to a biologically compatible solvent, such as water; and (3) biological treatment, which degrades the pollutants to innocuous products. The fluid extraction component relies on supercritical carbon dioxide or other environmentally benign solubilizing agents to extract contaminants from soil. In the separation step, contaminants are solubilized in a separation solvent, so that the clean extraction solvent can be reused in the extraction process. Bioremediation takes place in above-ground aerobic bioreactors and uses a mixture of microbial cultures. Pilot-scale testing of the system at a Superfund site contaminated with 2- and 6-ringed polycyclic aromatic hydrocarbons (PAHs) was completed under the ETP in fall of 1992.

Anaerobic Bioremediation

Two pilot-scale studies of an anaerobic process for bioremediating soils contaminated with nitroaromatic compounds, such as trinitrotoluene (TNT) and 2-sec-butyl-4,6-dinitrophenol (dinoseb), have been completed under the ETP. In this process, contaminated soils and sludges are diluted to slurries containing 50 percent water and placed in fiberglass vessels. A carbon source, such as starch, and an anaerobic, starch-degrading microbial consortium then are added to the vessels to degrade nitroaromatics. The technology was tested under the ETP on soils from dinoseb-contaminated sites in Idaho and Washington. Based on the results of these tests, the technology was accepted into the SITE Demonstration Program in winter of 1992.

Newly Emerging Technologies

In addition to the technologies used in the completed projects described above, nine bioremediation technologies currently are being developed under the ETP. These technologies, their developers, target media and contaminants, and dates of acceptance into the ETP are shown in Table 1. [Table 1 not available in this version.]

For more information about the SITE Emerging Technology Program, contact Ronald Lewis at 513-569-7856.

From the EPA Bulletin Board System newsletter, *Bioremediation in the Field*, August 1993



Osterburg: '91 Founder's Lecture

continued from page 7

examination of forensic evidence might best be conveyed by quoting from a text which, even today, is highly regarded by document examiners:

The recognition, correct interpretation, and complete comparison of elements, characteristics and all qualities, are the essential phases of a scientific handwriting examination. The word "quality," when understood as an element of condition of anything, is perhaps a better single descriptive term than "characteristic" when used as a general descriptive term in connection with the identification of handwriting, although "characteristic," when defined in its wider sense as anything that may describe or characterize, may be technically correct. Included among the qualities of a handwriting would, no doubt, be its distinctive features which would, more strictly speaking, be its characteristics. The word "element," which refers more to the separate physical parts of a thing, is also an appropriate descriptive term and in some connections preferable to quality. The word "quality" is no doubt a more general term and refers to a more extended or pervasive idea than element.(9)

But the second edition of the above text adds a noteworthy feature: in its Introduction the author pinpoints an epistemological difference between science and law:

It can hardly be believed now that less than fifteen years ago, no standard of comparison, no genuine writing whatever, could be introduced, either to prove genuineness or forgery, in the United States federal courts, or in the state courts of many states, including the great states of Illinois, Indiana, and Michigan. In many courts reasons for opinions could not be given on direct examination, and the use of photographs and microscopes and other instruments always was objected to and these aids of proof often were excluded.(10)

Our work environment continued to be discouraging, consisting as it did

of the paucity of published material and colleagues who begrudingly offered onthe-job training. What became more and more obvious was the need for a basic text dealing with the principles of chemistry and physics as they could be applied to crime laboratory work. It would take eight years to complete the research and writing for An Introduction to Criminalistics.(11) We utilized the newly coined "criminalistics" for a title, and the text remained in print for thirty years (Indiana University Press having bought the plates in 1972). In 1949, however, our work was ignored by colleagues and police hierarchy alike; any mention of which took the form of snide comments, not infrequently addressed to us, by the laboratory's commanding officer. Our perception of near total isolation was dissipated one day by the arrival of a copy of "The Technician" sent by John Davis of the Missouri State Highway Patrol. It was good news to learn that our concerns and interests in what constituted the work of a crime laboratory were shared by others with scientific training.

Those concerns were shared, apparently, by another, as Duane Dillon informed me recently. Pursuing his interest in the history of criminalistics, he unearthed an unpublished review of An Introduction to Criminalistics by E.O. Heinreich. With respect to the text as a whole this reviewer was quite favorable; but two of my chapters met with his disfavor: Chapter 47-"Some Miscarriages of Justice Analyzed in the Light of Criminalistics," and Chapter 48 — "Looking Ahead." Despite Heinreich, I believed then and do still that they are among the most important in the book. Because several of my recommendations are now partially realized (though others have yet to be implemented), it might be worthwhile to examine the needs of the field as I anticipated them in 1949, against what has happened since. They were set forth under the following headings:(12)

The Need for an Institute for the Study of Criminalistics Qualifying Experts Advanced Studies

Standardized Procedures Internal Branding

Research Categories

Applied Instrumentation Fundamental Research Collection of Statistical Data Qualifying Experts

One of the earliest efforts to examine the process of qualifying an expert took place at the 16th Annual Meeting of the American Academy of Forensic Sciences (AAFS). During a session called, "The Principles of Evidence Evaluation," I gave a paper entitled "An Inquiry Into the Nature of Proof: The Identity of Fingerprints."(13) Its empirical data demonstrated the existence of a wide divergence among unquestionably qualified fingerprint experts when they evaluated the significance of individual characteristics (or points of identification) on which a fingerprint identity rests; i.e., ridge ending, fork, spur, and eye (among others). When there is a standard (as there is in England where 16 points are required), such divergences are not too significant. They become so when the number of points decreases; i.e., when fewer than 12 (the number used in the United States for many years) are noted and located, and an identification is then made based on the presence of some "unusual" characteristics. And they became even more serious after the International Association for Identification (IAI) adopted a resolution stating:

The International Association for Identification...hereby states that no valid basis exists at this time for requiring that a pre-determined minimum number of friction ridge characteristics must be present in two impressions in order to establish positive identification...(14)

The Report of the Standardization Committee of IAI continued:

...consideration (be given) to the feasibility of recommending minimum requirements of training and experience which a person should possess in order to be considered qualified to give testimony of friction ridge impressions before a grand jury or court of law.(15) Here is a more recent attempt to illustrate qualifications that support a claim of expertise in a forensic science:

- Undergraduate and graduage degrees in the relevant field of expertise;
- 2. Specialized training in the subject area as it relates to forensics;
- 3.Some training in forensics;
- 4. Those professional licenses or certifications universally recognized by professional groups in the expert's discipline;
- 5.Evidence of experimentation, teaching, publication within the specialty area, or some combination of these;
- 6. Prior disciplinary experience that is direct and relevant to the issue or issues being considered;

Also desirable:

- 1.Postgraduate (or postdoctoral) training;
- 2. Publications which appear in (reviewed) scientific journals;
- The development of scientifically acceptable tests or procedures;
- 4. Association with, and leadership in, appropriate professional and scientific societies, and
- 5.Experience as an expert witness.(16)

Advanced Studies

Underlying this recommendation was the recognition of the need for monographs prepared by chemists, biologists, and physicists which would relate their specialties to criminalists. As stated in 1949, "Within the past few years a trend has developed in science to have various leaders in their fields prepare a compendious treatment of their specialties describing the principles, instruments, and applicability to other branches of knowledge."(17) Its closest realization, perhaps, is Saferstein's *Forensic Science Handbook* published in 1982.(18)

Standardized Procedures

After Peterson's work on "Proficiency Testing" was published in 1978, the need for standardized procedures became apparent.(19) Later, the American Society of Testing Materials (ASTM) took some steps by establishing "Committee E-30 on Forensic Sciences." By dividing E-30 into many subcommittees, it permitted a wider scope of activities to be pursued; for instance:

Development of nomenclature and definitions, equipment, methods, and standard reference materials for the collection, preservation, scientific examination, and reporting of physical evidence for forensic purposes. Areas of interest include toxicology and drug analysis, pathology and serology, questioned documents, museum conservation, criminalistics, fingerprints, and firearms and toolmarks.(20)

An example of practical result was the effort by Committee 30.01 to standardize the detection and identification of accelerants by gas chromatography in suspected arson cases.

The emergence of proprietary methods for the examination of physical evidence points up the need for standardization; and, if more than one method is being marketed, the need becomes crucial. The different patented probes employed to analyze DNA come to mind, as do the three incompatible systems used in the United States for AFIS (Automated Fingerprint Identification System). This scenario clearly limits their utility. What is more important, unless standards are adopted, the premature building of a universal data base would not only be hampered, it might be futile, and certainly more expensive in the long run.

Internal Branding

Underlying this idea is the recognition that trace amounts of impurities in a substance need not only be present naturally or accidentally, they could be added deliberately at time of manufacture. For the criminalist, of course, the inherent value of trace elements is in the help they can provide in identifying the source of evidence, or in linking crime scene evidence to a perpetrator. A proactive approach, such as that which follows, would require the cooperation of industry on a nationwide scale:

...a complete plan, developed through research, would have to be presented to the manufacturers. The selection of trace elements for particular products would be determined by the Institute in conjunction with the manufacturer. In this way tracers could be selected which are not harmful to the user and which would not affect the appearance or quality of the product.(21)

Of the many kinds of evidence which might be internally "branded" for source identification (or crime scene linkage), only two attempts have been made; those have been for inks and explosives.

Research Categories

This section of the text recommended that three kinds of research would be significant: fundamental, applied instrumental, and statistical data collection.

Fundamental Research

Within universities the traditional role of the faculty is to undertake theoretical and fundamental research in their particular disciplines. Unfortunately, criminalistics has never received adequate funding; this sorry fact having much to do with internal university politics and priorities. The record has been dismal at best, but this need not have been so had OLEA and LEAA been administered by foresighted individuals. Instead, they managed to accomplish what President Reagan was unable to; i.e., wipe out a federal agency: in Reagan's case, the Department of Education. In the case of LEAA, the agency was wiped out in 1986 after a lifespan of only 14 years. In public administration circles it is an article of faith that, once born, such entities acquire a life of their own. For it to selfdestruct, therefore, required extraordinary ineptness. As a consequence, those of us in the forensic sciences could but watch a lost opportunity to assemble the critical mass needed to staff a quality criminalistics department for the education and training of Ph.D's at a single university.

Applied Instrumentation

Here the record is much better. Newly developed scientific instruments have been quickly adapted to the needs of the crime laboratory. If anything, some applications such as Neutron Activation Analysis (NAA) were premature, employed as they were before the nature of the problem, i.e., the identity of human hair, was clearly understood by the traditional scientists involved. Developments in DNA have quickly been applied to the examination and comparison of physical evidence; here too, caution needs to be exercised.

A most fruitful development in this area was the establishment of a Forensic Science Unit in the FBI's Quantico, Virginia facility. Concerned with enlarging its laboratory capability, either by the innovative adoption of existing instrumentation or the development of new technology, the FBI (in the late 1980's) introduced several new tools to support drug investigations. Among these were a hand held micro-dielectrometer, a portable gas chromatograph (GC), and ion mobility spectrometry (IMS). Since it is non-invasive and nondestructive, the latter instrumentation permits the detection of narcotics concealed in baggage or containers and the results constitute legally admissible evidence. In ongoing research, the Bureau has extended the use of IMS to the detection of explosives, rendering it of value in terrorism investigations.(22) Other forensic use of IMS is described in an article by Karpas in "Forensic Science Review."(23) Several IMS devices are now commercially available from Barringer Instruments of South Plainfield, N.J.

Collection of Statistical Data

A major difference between a scientist in a traditional discipline and a criminalist is that the latter's findings must sooner or later be presented to a lay person - a criminal investigator or members of a jury. They not only include the results of examination and comparison of crime scene evidence with known specimens obtained from a suspect, but the nature or meaning of such findings.

What, for instance, does it mean to a jury to be informed that a heel imprint found at the scene of a safe burglary has the same three characteristics (crack, nick, or gauge) as those found on the heel of a suspect's shoe? Are three such characteristics sufficient to testify that the crime scene impression was made by the suspect's heel? Or that it could have been? In the latter case, if one follows the logic employed by fingerprint and firearms experts, the conclusion would have to be that it could not have been made by the suspect's heel. To the fingerprint and firearms expert, either an identity exists or it does not: there is no such thing as a grey area-"it could have been made" (by the examplar). In a questioned handwriting, is the formation of a particular number or letter common or uncommon? Is the enscribing of the number seven as: 7, uncommon? Not if the writer was schooled in Europe. In the absence, therefore, of a precise information concerning the frequency of a characteristic it is necessary to employ estimates based on experience. Not to belabor the point, statistical empirical data are required to interpret scientific findings. As new technology emerges, quantitative empirical data (in contrast to mere estimates based on experience) concerning relative frequency will be needed if those findings are to be interpreted properly. A current example involves both legal and scientific questions regarding DNA. The basic issue is whether or not the major ethnic groups are statistically substructured; and if this has a major impact on the relative frequency of blood genetics, for instance.

Looking Toward the 21st Century:

PROGNOSTICATIONS ANEW

Much remains to be done if criminalistics (and forensic science) are to meet the mounting criticism which has appeared in both popular and professional literature. Disapprobation has focused on two themes: miscarried justice and ethical conflicts.

Miscarriages of Justice

National attention has been drawn to the failures of the criminal justice system by the publicizing, through the media of television, movies, and books, of justice miscarried.(24-26) Had criminalistic services (and forensic science in general) been involved, at least some unfortunate convictions might have been prevented. To the extent that they are not yet fully available, especially to small departments, the criminal justice system deserves reproof.

Ethical Conflicts

The growing interest in ethics was manifest at a symposium led by Professor Joseph L. Peterson at the 1989 annual meeting of the American Academy of Forensic Sciences entitled, "Ethical Conflicts in the Forensic Sciences."(27) Other indications of concern are to be found in the code and guidelines developed by the American Society of Crime Laboratory Directors.(28) Earlier in this paper, I also referred to Hollien's work regarding ethics and the expert witness.(29)

Feasible Responses

In regard to some potential ways of addressing these issues, I would like to discuss two major possibilities: expansion of forensic science services, and action dealing with external criticism.

Availability of Service

Forensic science assistance is least likely to be available to small police agencies and to defense attorneys. To remedy this drawback, small police departments could form a consortium to support a not-for-profit, full-scale crime laboratory, the costs to be shared based on a jurisdiction's crime rate and population. Departments that rely on their state crime laboratories for the analysis of evidence (in narcotics cases, for example) have experienced long delays in obtaining test results; this can cause dismissals since proof is lacking that narcotics were involved. Because start-up costs for a consortium laboratory would certainly exceed what small departments could budget for, even collectively, foundation grants would have to be sought; in return, its services could be extended to include private and public defense attorneys. Potential conflicts of interest must be considered, i.e., when the same laboratory serves both prosecution and defense. This raises the question of the location of such forensic laboratories within the criminal justice system. Granted that an answer is clearly beyond the scope of this paper, but the topic could make for an interesting symposium.

External Criticism

Law professors in particular have begun critically to evaluate various aspects of forensic science; for example, Risinger et al., asks whether or not expertise in handwriting comparisons exists.(30) A more far-ranging criticism by Jonakait examines the implications of the results produced in the proficiency tests mentioned earlier.(31) Other academic criticism should be anticipated from History and Philosophy of Science Departments: when they become aware of the less than rigorous ground upon which some of the forensic sciences rest, epistemological questions will undoubtedly be raised. To forestall such potential criticism, it is crucial that we take precautionary measures by means of research, the building of data bases, standardizing test procedures, and so on. To be forewarned is to be forearmed. If this prognostication is ignored, it will imperil forensic science in the future.

Conclusion

The most trenchant criticism thus far has emanated from the professoriate of law schools, and more is anticipated from History and Philosophy of Science Departments. Though a proper response should normally come from the forensic science professoriate, there is but a handful of such faculty members. Meanwhile, so long as criminal justice departments are staffed for the most part by social scientists who generally are averse to the appointment of criminalists to their faculties, the situation will be slow to change. In at least two cases known to the writer, professors of criminalistics have received a

warmer welcome from academic departments allied to a medical school; this having been so, the paucity of departments of forensic medicine is even more surprising. Given the size of its professoriate, therefore, we can neither look in that direction for a defense nor for the vigorous dialogue which is demanded. There will be improvement when the forensic professoriate is in balance with the practioners; that is, following the chemistry paradigm where professors make the theoretical advances while practitioners adapt them to the needs of the field. Whereas, the test in chemistry is whether the field finds the new idea useful, in forensic science it goes beyond mere utility. There the test is in meeting a legal as well as a scientific challenge made by the defense in the court room, a challenge which often receives the assistance of collaborating experts eager to demonstrate any weakness, however, minor, in the theoretical underpinning of the new method.

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- Peterson, J.L., "Ethical Conflicts in the Forensic Sciences," J. For. Sci., 34(3), 717-748 (1989).
- 28. Ibid., pp. 755-760.
- 29. Hollien, op. cit.
- Risinger, et al., "Exorcism of Ignorance as a Proxy for Rational Knowledge," U. of Penn. Law Rev., 137, 731-785 (Jan. 1989).
- Jonakait, Randolph N., "Forensic Science: The Need for Regulation," *Harvard J. Law and Technology*, 4, 109-191 ('Spring 1991).



ABC CERTIFICATION GENERAL KNOWLEDGE EXAMINATION

The American Board of Criminalistics General Knowledge Examination (GKE) will be offered at the CAC spring meeting on Saturday May 14, 1994 in Oakland. The test will take place in the afternoon. The exact time is yet to be determined.

The sitting fee for individuals taking the GKE is \$120. A completed application along with a \$30 application processing fee must be submitted to:

> Gloria Napolitano ABC Registrar P.O. Box 209 Greenlawn, NY 11740-0209 FAX: (516) 261-2120

NO LATER THAN JANUARY 14, 1994 to be eligible to sit for the GKE in May. For an application, write or FAX Ms. Napolitano.

ABC DIPLOMATE CERTIFICATES

All CAC Certificate holders that have applied for obtaining an ABC Diplomate certificate should have their certificates. Any applicant that has not received their certificate should contact Steve Renteria, ABC Representative. (213) 226-4978.

Announcements

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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, British Columbia. Workshops and original presentations will run from October 31 through November 5, 1994. For further information, please contact: Jeffrey Caughlin, RCMP Forensic Laboratory, 5201 Heather Street, Vancouver, BC V5Z 3L7, (604) 264-3507.

International Association of Forensic Toxicologists and Society of Forensic Toxicologists Joint Congress October 31 - November 4, 1994 Tampa, Florida 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 Tessaloniki, Macedonia, Greece For further information, please contact: Prof. Dr. An. Kovatsis, Laboratory of Biochem-Toxicology, Aristotelian University of Thessaloniki 540 06, Tel. (031) 991-004.

Stress Management Workshop

January 20, 1994. The workshop will be held at the Oakland Police Department, Room 505. Call Jennifer Mihalovich at (510) 222-8883 for more information. A dinner meeting will follow the workshop.

When Next We Meet...

'94

Spring— Oakland Police Department Oakland Airport Hilton Chair - Mary M. Gibbons

Fall— Los Angeles Coroner/Holiday Inn Pasadena Chair - Manuel Munoz (Joint Meeting with The Forensic Science Society)

'95

Spring— Contra Costa County Sheriff Chair - Karen Sheldon

Fall— Los Angeles Police Department Chair - Joe Hourigan

'96

Spring— Santa Clara County Crime Lab





Snapshots from the most recent McCrone School... Photos courtesy of Carol Hunter. Seen in Forum, Jan-Feb 1986:

4. Probation Report

(Jack Funk, Martinez)

The defendant states that her first and only marriage occurred in 1979 when she was wed to James D. She reports he died of a "bad stomach." Long Beach Police records confirm that Mr. D., indeed, died of what could be termed a bad stomach, two days after the defendant plunged a teninch barbeque fork into it.

BIZARRO By Dan Piraro



THE FAR SIDE By Gary Larson



"Sorry, ma'am, but your neighbors have reported not seeing your husband in weeks. We just have a few questions, and then you can get back to your canning."



Got a good caption for this picture? Send your ideas to the Editor, and we'll run the best of 'em next time!

Calvin and Hobbes





D1993 The California Association of Criminalists For information, contact Mary Murphy Hong, Membership Sect'y (714) 834-4510

