

News of the California Association of Criminalists • Fall 1995

The CACNews



The President's Desk

Carol Hunter



Don't count on compliments to fulfill your sense of accomplishment

"The factory of the future will have only two employees, a man and a dog. The man will be there to feed the dog. The dog will be there to keep the man from touching the equipment."

—Warren Bennis, Prof., Business Admin., USC

I read an article the other day about job commitment. What does job commitment mean to you? Hard work and dedication toward your employer? Do you think that there are any benefits for you as an employee to be committed? Or is the flow of energy simply outward from you to your employer?

Job commitment can be a of self-commitment. Working diligently, giving that extra effort on yet another last minute rush case will benefit your boss, and the submitting agency and the attorney, but these efforts will benefit you as well. Those individuals whom you greatly assisted will be appreciative and you should feel some satisfaction and fulfillment for helping them achieve each of their goals. Should you hear compliments and "strokes" from those persons for whom you've just broken your back? That would be wonderful, but don't count on such compliments to fulfill your sense of accomplishment.

In today's marketplace and today's crime laboratories, management is demanding more and more from fewer and fewer people. Pressures are great on all levels; everyone is expected to achieve higher throughput with fewer resources. Now more than ever it is important to maintain a high job commitment if for no other reason than to give yourself a greater sense of self. If you hate your job and hate all of the demands and hate the thought of yet another rush case or hate the thought of one more late night crime scene, you will dread going to work and dread seeing your colleagues and probably lower your job performance. However, if you take your job and look forward to all of the demands and are challenged with the thought of yet another rush case or one more late night crime scene, you will enjoy going to work and appreciate seeing your colleagues and raise your job performance. It is really in your best interests if you continue a high job commitment. And as a result, you will be more productive and benefit those individuals relying on your work product.

And oh yeah, that article I read.... it concluded with the following:

"Bottom line, commitment is a gift you should give to yourself."

Carol

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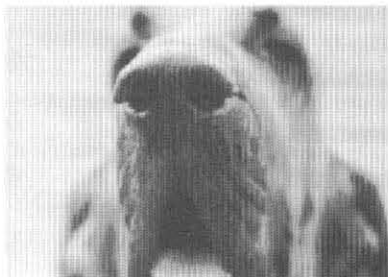
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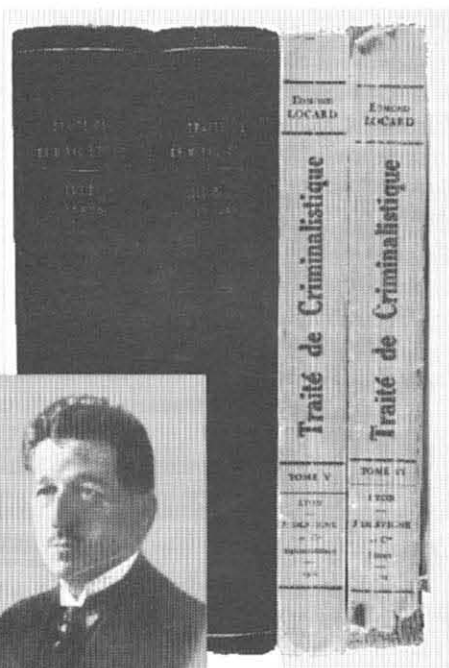


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analytical device
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*Edmond Locard at
the age of 50.
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Notice to Contributors

This newsletter publishes material of interest to its readers and is pleased to receive manuscripts from potential authors. Meetings and course announcements, employment opportunities, 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, we request 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). Text files from word processors should be saved as ASCII files without formatting codes, e.g. bold, italic, etc. An accompanying hardcopy of the file 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 are: December 15, March 15, June 15 and September 15.

Southern Section Activities



Pablo Escobar, drug kingpin of the Colombian drug cartel. Donald Scott, whose death as a result of a raid on his home escalated into a political fray between the Sheriff of Los Angeles and the District Attorney of Ventura. Richard J. Daley, Mayor of Chicago and political boss during the era of the Chicago seven. Enrique Camarenas, DEA agent whose kidnapping and execution at the hands of Mexican drug lords strained relations between the United States and Mexico. What's the common thread among these famous names? If you attended the CAC dinner meeting on June 22, hosted by **Michelle Merritt** and the crew of the Riverside DOJ-BFS laboratory, you would know that these are all individuals familiar to the invited guest speaker, Anthony Ricevuto.

Mr. Ricevuto is currently the Associate Special Agent in charge of the Riverside Office of the Drug Enforcement Administration. His career in law enforcement started with the Chicago Police Department where his first assignment as a rookie officer was riot control during the Democratic National Convention in 1968. In 1973 he joined the ranks of the DEA, serving that agency in such diverse locations as Columbia and Guatemala. He has filled a variety of positions, including internal affairs and his most recent assignment as special agent in charge of the Riverside field office. Mr. Ricevuto focused his presentation on the need for local and federal agencies to work together in our "War on Drugs", punctuating his talk with behind-the-scenes commentary on the importance forensics has played in his cases. Thanks go to the Riverside staff for an interesting evening with a fine speaker.

Two study groups were held in conjunction with the dinner meeting. **Dean Gialamas**, who recently found himself as sole chair of the Serology Study Group, was called on for double duty as the Serology and DNA study groups banded together to further discuss contamination issues and sample handling techniques. The two groups also watched another segment of Training and Resources "Against All Odds: Inside Statistics" video series. The Toxicology study group, co-chaired by **Dan Anderson** and **Chris Hargens**, invited Bernie Sanchez to speak on "Pharmacology and Pharmacokinetics of Barbiturates." Bernie provided handouts of his topic, so if you were unable to attend and are interested in his handout, you may reach him at the LAPD crime lab.

Finally, your friendly Regional Director-South is looking for members excited about their profession and willing to volunteer some of their time, talents, or even just ideas. Currently the Southern Drug and Serology study groups are in need of chair persons. If you don't feel you have the time to devote to these groups, perhaps you have an idea for a dinner meeting. Like TV advertisers are fond of saying, there's no obligation. Please, give me a call - I would appreciate your input.

—Dave Stockwell
Regional Director South

It's "Doctor John" Now



The California Dept. of Justice, Bureau of Forensic Services announced that Criminalist-Supervisor **John DeHaan** has completed his Ph.D. thesis on "Reconstruction of Fires Involving Highly Flammable Liquids." This goal was accomplished as an external student in the Forensic Science unit of the Univ. of Strathclyde in Glasgow, Scotland. This entailed two weeks per year "on-site" in Glasgow with the actual experimental and research work done in the CCI laboratory in Sacramento. Over a four-year period, some 3,000 hours were spent gathering and analyzing data and reporting the results, nearly all of which were done on DeHaan's personal time. This necessitated the use of vacation and considerable unpaid leave, particularly over the last nine months. DeHaan purchased his own scientific equipment or arranged to borrow equipment from other laboratories or vendors.

DeHaan, a recognized authority on fires and explosions, conducted this research to enable fire investigators to reconstruct the physical factors and time elements involved in accidental and intentional fires where flammable vapors were ignited.

DeHaan, a native of Chicago, earned his B.S. degree in physics in 1969 from the U. of Illinois at Chicago. He has been a criminalist for over 25 years, serving with the Alameda Co. Sheriff, the Bureau of Alcohol Tobacco and Firearms, and the Calif. Dept. of Justice, where he is currently Impression Evidence Program Manager. He has been responsible for the analysis of evidence from hundreds of fires, bombings and explosions across the U.S. He lives in Vallejo with two Irish Wolfhounds and a collection of vintage sports and racing cars.

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Jobs • Meetings • Courses

Bloodstains

A joint conference between the International Association of Bloodstain Pattern Analysts and the Association of Crime Scene Reconstruction will be held October 5-7, 1995 at the Meridian Plaza Hotel in Oklahoma City OK. Contact Tom Bevel, 701 Colcord Dr., Oklahoma City, OK 73102. (405) 297-1225 or FAX (405) 297-1360.

Crime Laboratory Analysts Wanted

\$30,946-52,145. Openings in the areas of Serology/DNA, Firearms, Latent Prints, Toxicology and Chemistry. Applicants must have a bachelor's degree from an accredited college or university with a major in forensic science, criminalistics or in a physical or natural science and one year of professional experience in a forensic laboratory including completion of a recognized crime laboratory analyst training program from a forensic laboratory. Professional or technical experience in a forensic laboratory or in the identification or analysis of fingerprints can substitute on a year-for-year basis for the required college education. Contact: The Florida Department of Law Enforcement, Bureau of Personnel Management, P.O. Box 1489, Tallahassee, FL 32302 phone (904) 488-4814. EOE.

Forensic Scientist

GeneLex Corporation, a nationally recognized leader in forensic DNA testing, has an immediate opening for a qualified forensic scientist. Primary duties will be in the identification, screening, DNA analysis, interpretation and testimony regarding serological evidence derived from major crimes.

Contact: Howard C. Coleman, President, 2203 Airport Way South, Suite 350 Seattle, Washington 98134 1 800 523-6487 Facsimile 206 382-6277

Certification Examinations

The American Board of Criminalistics will offer certification examinations at the Fall 1995 Seminar of the California Association of Criminalists in Los Angeles. The General Knowledge Examination, and speciality examinations will be offered on October 21, 1995. The speciality examinations will include Forensic Biology, Trace Evidence, Drug Identification, and Fire Debris Analysis. Successfully passing the General Knowledge Examination will qualify the applicant for Diplomate status with the ABC. Passing of any of the specialty examinations will qualify the applicant for Fellow status. Other requirements, e.g., experience, pertain as well. Any person wishing to sit for one of these examinations should contact the CAC Examination Site Coordinator: **Peter D. Barnett**, Forensic Science Associates, 3053 Research Drive, Richmond, CA 94806(510) 222-8883 FAX (510) 222-8887.

SOFT 26th Anniversary

The Society of Forensic Toxicologists are planning a 1996 meeting in Denver from Oct. 14th—19th. For more information please contact Laurel J. Farrell or J. Robert Zettl, Colorado Dept. of Public Health and Environment, Division of Laboratories, P.O. Box 17123, Denver, CO 80217. Phone (303) 691-4727 or (303) 691-4738.

MAFS 25th Annual Meeting

The 25th annual meeting of the Midwestern Association of Forensic Scientists will be held October 7-11, 1996 in Dayton, Ohio. For more information please contact Denise Rankin /Laura Kiddon, Miami Valley Reg. Crime Lab, 361 West Third Street, Dayton OH 45402, (513) 225-4990.

"Sex, Drugs and Children" Conference

A training conference on the topic "Investigation of Crime: Sex, Drugs and Children" will be presented in New Orleans on October 23 and 24, 1995. The fee is \$250 for registration prior to October 9 and \$280 after. There is a \$25 cancellation fee. The conference is presented by The Center for Medicolegal Research and Consultation. For more information contact Karen Griest, MD, 160 Washington, SE #234, Albuquerque, NM 87108. Phone (505) 281-8109.

SERI Seeks Serologist

SERI is accepting applications for Serologist III. This position acts as an experienced case analyst performing both preliminary and advanced testing in conventional serology, ABO, Gm/Km, enzyme and protein genetic markers, and DNA analysis with emphasis on PCR markers. Testifies in court as an expert witness in forensic serology. May be retained by prosecution, defense or the court in criminal or civil matters. Salary: \$3800.00-4400.00/mo plus Health and Dental Coverage, Pension Plan, Long term disability Insurance. SERI Encourages and Supports Ongoing Professional Development

Contact Serological Research Institute, 3053 Research Dr., Richmond, CA 94806, 510-223-7374, FAX 510-222-8887

Forensic Wound Pathology Course a Success

The CAC Training and Resources Committee sponsored a Forensic Wound Pathology seminar instructed by Dr. Patrick Besant-Matthews last July. Committee Chair, Dean Gialamas reported the four-day course was well attended by about 80 registrants, including criminalists, forensic nurses, detectives, coroner personnel, crime scene investigators, attorneys, pathologists and even a crime scene illustrator.

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Gialamas CAC/FSS Joint Presidents' Award Recipient

To refresh your memories, at the 1994 Fall Semiannual CAC meeting joint with the Forensic Science Society (FSS), our two organizations announced the creation of the **Joint Presidents' Award**.

Award. This award shall be given annually to recognize outstanding new members to the profession of criminalistics. In even numbered years, the award will be made to a member of CAC. In odd numbered years, the award would be made to a member of the Forensic Science Society. For the purposes of this award, the CAC award winner will be the recipient of the Paul Kirk Award; the FSS award winner will be their recipient of the Young Scientist Award.

The Joint Presidents' Award recipient will be sponsored as a guest to attend a conference of the complementary association. Air travel will be provided by the generous corporate sponsorship of IBIS Corporation. The host association will provide lodging and meeting registration to the visitor for the duration of the conference.

This summer our CAC Paul Kirk Award winner Dean Gialamas began the tradition of the Joint Presidents' Award exchange. In July Dean attended the FSS Summer Scientific Meeting at the College of Ripon and York St. John in York. The program theme was Advancement in Science with four major categories of Crime Scene Management, Fingerprints, Enhancement and DNA. Dean presented a paper entitled "Enhancement of Fire Scene Investigations Using Accelerant Detection Canines" at the Saturday Enhancement session.

Before and after the meeting, Dean and his wife Carolyn were guests of President Viv Emerson. They toured Forensic Science Service (formerly HOCRE) in Aldermaston and the Metropolitan Police Forensic Science Laboratory (Met Lab). He learned that FSS is now a case work not a research laboratory as a result of the privatization of crime laboratories in England. Dean was highly impressed with their extremely well-equipped laboratories. He was also pleased to finally meet various British colleagues he has heard about over the years and put faces with names. Dean and Carolyn also took some time to "play tourists" and saw such sights as Stonehenge, Windsor Castle, Westminster Cathedral, Buckingham Palace, House of Parliament and the list goes on! Dean obviously had a highly educational and cultural experience ... only he didn't attempt driving on the "other" side of the road!

This first exchange of one of our young scientists was a wonderful success. We look forward to the FSS recipient of the *Joint Presidents' Award* next year.

—Carol Hunter

Forensic Positions Sought

Motivated and enthusiastic recent Calif. State Univ., Sacramento graduate seeks permanent career as Criminalist / Toxicologist. Holds degrees in forensic science (chemistry minor) and biological sciences (molecular biology concentration). CAC affiliate since 1992. Certified Glock armorer. Internship with San Francisco PD's Identification Bureau gaining experience as Fingerprint Technician (including operation of Automated Fingerprint Identification System-AFIS).

Familiar with forensic principles, practices, procedures and techniques used in examination and analysis of controlled substances, blood fibers, hair, inks, glass, trace evidence, fingerprints, toolmarks and questioned documents. Experienced with computer applications including MS Word, MS Excel and Pagemaker.

Bonnie C. Choy, 6815 Havenhurst Dr., Sacramento, CA 95831 Phone: (916) 429-0869.

Firearms and toolmarks intern for the past six months at Santa Clara County Crime Lab seeks a position in the field of forensic science. Possesses Bachelor's in microbiology from UC Santa Barbara and Bachelor's in forensic science with a minor in chemistry from CSU Sacramento. Strong computer background. Hardworking, enthusiastic, organized individual—willing to relocate.

Kim Perkins, 1800 El Verano Way, Belmont, CA 94002 Phone (415) 593-5726.

It's never too late!

THE
LOS ANGELES POLICE DEPARTMENT
CRIMINALISTICS LABORATORY
IS HOSTING THE
86TH SEMI-ANNUAL SEMINAR
OF THE
CALIFORNIA ASSOCIATION OF
CRIMINALISTS

To be held from October 18-21, 1995, at the Sheraton Los Angeles Harbor Hotel, San Pedro, California. Room rates are \$79 plus tax, single or double. The hotel is located adjacent to Ports O'Call (shopping and dining), World Cruise Center and the Maritime Museum. Scheduled events include DNA User's Group meeting, Courtroom Testimony Skills workshop, Forensic Report Writing workshop. For more information, please call Joe Hourigan (213) 237-0057 or Larry Blanton (213) 237-0061.

Why Join the CAC?



That was the question I asked my DOJ laboratory manager, Bob Ogle almost 20 years ago. Despite his listing several good reasons, I decided **not** to join. My decision was based partly on the fact that I didn't think I knew enough about criminalistics to become a member and the other part was that I have a natural (or unnatural) resistance

to joining organizations, forensic or fraternal. These two reasons kept me from joining in 1975 and it would only be with Bob's persistence that I finally did join 4 years later.

Since joining, I have attended 17 CAC seminars and presented 9 papers. I have been a section moderator, hawked CAC merchandise, hosted an entire CAC hospitality event and have conducted workshops on courtroom testimony skills. And most of this activity occurred while I was working in another state. The ben-

efits I received as a member are not generally on any members list. Since I paid for 16 of the 17 seminars I attended, I knew that I had to get the most value for my buck. I could count on high quality papers, friendly exchange of ideas with friends and colleagues while staying current with the latest scientific equipment and techniques. Going to CAC seminars and reading the *CAC News* gave me the assurance that I would maintain a high level of proficiency in criminalistics.

That's why I'm looking forward to the Fall 1996 CAC meeting in San Pedro, hosted by LAPD crime lab. Something unique is scheduled for the first day on the technical program: A three hour course entitled, "Conversational DNA" hosted by Greg Matheson. This presentation will give the non-DNA crowd the opportunity to become more conversant in DNA and it will also give the DNA crowd the opportunity to become better able to communicate their discipline to others. And since I'm in the group that wouldn't know an allele from an alibi, I am looking forward to learning more about DNA. Even if you only attend the Thursday morning session of the program, you'll get your money's worth. Don't miss this opportunity. Contact Joe Hourigan or Larry Blanton at LAPD, to register for the Fall seminar. See you in San Pedro.

Raymond

Biology 101 Revisited

Editor:

As a former science teacher, I must express my frustration and disappointment with the attitude expressed by certain excused OJ jurors regarding DNA evidence ("Lots of people have the same blood type..."). To so completely misunderstand the value of that evidence after a month of testimony makes several points clear: First, no matter how a topic is presented, there will probably be someone who can't understand it, but I am convinced that our current methods of "teaching the jury" are inadequate. Real teaching is an interactive experience. Good teachers can vary the scope, sequence and pace of their instruction depending upon how the student is absorbing the data. Therein lies the problem, since the witness (teacher) cannot assess how well the presentation is being absorbed. One cannot ask the sleepy-looking juror in the corner, for example, to repeat what was just said, or to apply the last point to a real-life situation.

The witness/teacher has only one "gun" in his or her arsenal: oral exposition, possibly illustrated with visual aids. If the material is difficult or tedious, the "students" will tune it out and wait for the "bottom line", does

it match? They'll use their experience as adults to evaluate the credibility of the witness. Unfortunately, this may be based more on the witness' clothing or the tone of voice used in answering questions rather than on the content of the testimony.

Advertisers have known for decades that success depends upon getting the customer to understand the message and to remember it. To be successful one must appeal to the lowest common denominator, breaking the message down into simple concepts: chew-this-gum-and-get-the-girl. Such a basic message may be boring to folks who are more sophisticated, but virtually everyone will understand the message, and if effectively presented, remember it.

Thus, I propose that our organization look into producing a short, animated video which will convey the most basic concepts about DNA, e.g. what it is and what it does, in as non-controversial style as possible. The CAC, being not biased toward one side or the other, could produce a video which would fairly present the material. It should not contain information which could become out of date quickly, such as typing methods or probe names, but rather something that would make up for those who slept through high school biology.

—John Houde
Ventura

Technical Note:

Similarity Between Human and Hyena Hair

John I. Thornton, D.Crim. and Jennifer E. Riedel, M.P.H.

Historically, the width of the medulla in a hair has been the eminent feature in distinguishing a human hair from an animal hair. Human hair is likely to display a medulla whose width is less than a third of the diameter of the hair, while animal hair is likely to have a medullar wider than a third of the hair diameter. Exceptions are known, however. McGinnis and Thornton [1] have provided a list of a number of animal hairs with narrow medullae; these include:

Beaver (*Castor*); Angora goat (*Capra*); Bear (*Ursus*); Pig (*Sus*); various species of Cow, Ox, Yak, and Bison (*Bos* and *Bison*); various species of Llama, Alpaca and Vicuna (*Lama* and *Vicugna*); various species of otter (*Lutra* and *Enhydra*); various species of seal (*Callorhinus* and *Otaria*); Arctic fox (*Alopex*); Badger (*Taxidea*); several skunks (*Mephitis* and *Conepatus*); the Spiny Anteater (*Tachyglossus*), and the Red Kangaroo (*Macropus*).

In a more extended discussion of the significance of medullary form in animal hair, McGinnis and Thornton point out that the scales or cuticle of the hair will ordinarily serve to distinguish between human and animal hairs, even within the group of animal hairs with narrow medullae. But in reviewing the mounted mammalian hair collection in the U.S. Fish & Wildlife National Forensics Laboratory, one of us (JIT) noticed that *hyena hair has both a narrow medulla and a cuticular pattern which is exceedingly similar to that of human hair*. This was verified by one of us (JER) by the direct collection of hair from three living hyenas. The present authors do not suggest that hyena hair is likely to be distributed around the typical crime scene. But it is important to be able to (1) enunciate the features that are taken into consideration in forming an opinion as to the origin of an evidence hair, (2) to specify the exceptions to these features, and (3) to delineate the scope of the studies that have permitted these features to be applied. On the basis of the appearance of hyena hair, any statement that human (and higher primate) hair can be distinguished from all other animals on the basis of medullary width and cuticular form would seem to be unsupportable.

Reference

[1]. McGinnis, Malcolm, and Thornton, John I., "Narrow Medullae in Animal Hairs", *FBI Crime Laboratory Digest*, Vol. 13, No. 2, April 1986, p. 51-53.

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Off the Internet:

College and University Forensic Science Programs Graduate and Undergraduate

Jay Siegel¹ and Charles Midkiff²

The Council of Forensic Science Educators was formed in 1989. It consists of those individuals who have an interest in forensic science education. The Council is run under the auspices of the American Academy of Forensic Sciences.

One of the principal activities of the Council since its inception has been to identify universities and colleges worldwide that offer forensic science on the undergraduate or graduate level, either as a stand-alone degree program or as part of another degree (e.g. an emphasis, minor or concentration). These activities were carried out by the Council graduate and undergraduate committees, who have included Walter Rowe and Moses Schanfield (undergraduate committee), and Robert Gaensslen and Walter Rowe (graduate committee).

At the same time, working independently, Charles Midkiff, of the Bureau of Alcohol, Tobacco and Firearms - National Laboratory, Rockville, MD., has been developing his own list of graduate and undergraduate forensic science programs. With Mr. Midkiff's permission and cooperation, the two lists have been merged and are presented below.

The Council makes no claims that the lists are entirely accurate or complete. We apologize for any omissions and/or misinformation. All additions or corrections should be directed to Jay Siegel.

GRADUATE PROGRAMS

Master of Science in Forensic Science

Program leads to a formal Master of Science in Forensic Science

University of Alabama at Birmingham Department of Criminal Justice Graduate Program in Forensic Science University Station Birmingham, AL 35294, Dr. Frederick Smith (205)934-2069

Requirement: 42 or 48 semester hours, thesis/non thesis option. Internship (6-12 hours credit) under either option. Graduate assistantships and fellowships, in-state tuition rate available to students from certain states. Areas of specialization: Trace evidence Forensic serology Drug chemistry. Detailed information not available.

California State University - Sacramento School of Health and Human Services Division of Criminal Justice 6000 J. St. Sacramento, CA 95819, Professor Leo Hertoghe (916)278-6487

¹President - Council of Forensic Science Educators and Professor of Forensic Science, Michigan State University, East Lansing, MI. ²Forensic Chemist - Bureau of Alcohol, Tobacco and Firearms, National Laboratory, Rockville, MD

Forensic Science Programs

The **George Washington University** Department of Forensic Science 2036 H. St. N.W. Washington, DC 20052, Charles O'Rear - Chair (202)994-7319

Requirements: 30 semester hours and thesis (6 hours) and written Master's comprehensive examination A limited number of graduate research fellowships and teaching assistantships are available Areas of specialization: Forensic serology Forensic toxicology

John Jay College of Criminal Justice City University of New York 445 West 59th St. New York, NY 10019, Dr. Peter DeForest (212)237-8899

Requirements: 30 semester hours and thesis or 33 hours and one year individualized research project Assistantships and adjunct lecturer positions available.

National University Business Law, Criminal Justice, Public Administration 4025 Camino del Rio South San Diego, CA 92108-4107, Hon. Victor E. Bianchini - Chair (619)563-7438

Requirements: 60 quarter units. Course format: one course/month, two nights/week = 5 quarter units. Financial aid: student loans, grants and graduate fellowships.

University of New Haven Forensic Science Program 300 Orange Avenue West Haven CT 06516, Dr. R.E. Gaensslen - Director (203)932-7000

Requirements: 40 credits including either an internship, research project or thesis. Teaching and research assistantships available. Areas of specialization: Criminalistics Advanced Investigation Fire Science.

Related Masters Programs—Master of Science in Criminalistics

California State University - Los Angeles Department of Criminal Justice 5151 State University Drive Los Angeles, CA 90032, Mr. Anthony Longhetti (213)343-4610/4616. Requirements: 45 units including thesis.

University of Illinois - Chicago College of Pharmacy Room 346F Pharmacy Bldg. m/c 865 833 S. Wood, St. Chicago, IL 60680, Dr. David Stoney (312)996-5290 Requirements: 48 quarter hours including thesis (12 quarter hours minimum) and oral exam. Internship (4 quarter hours) for student without equivalent work experience.

Master of Forensic Sciences

The **George Washington University** (see above)

Requirements: 36 semester hours

and written master's comprehensive examination. Program designed for students with a non-physical or life science background. Equivalent to M.A. degree.

Master of Science in Chemical Toxicology

The **George Washington University** (see above under MSFS)

Master of Science in Criminal Justice/Concentration in Forensic Science

Albany State College Department of Criminal Justice 504 College Drive Albany, GA 31705, Dr. Samendra Basu (912)430-4864. Detailed information not available

Michigan State University School of Criminal Justice 506 Baker Hall East Lansing, MI 48824-1118, Dr. Jay Siegel (517)353-5283

Requirements: 30 credit hours with 6 credit thesis. Internship (up to 8 credits) available. Some teaching assistantships available. Areas of specialization: Drug Chemistry Trace Evidence

Virginia Commonwealth University Department of Justice and Risk Administration 816W. Franklin Ave. Richmond, VA 23284, Professor James E. Hooker (804)367-1050

Requirements: 36 or 39 semester hours depending on program. Areas of specialization: Drug analysis Serology Trace evidence.

Master of Science in Chemistry - Forensic related research

West Chester University Department of Chemistry West Chester, PA 19383, Dr. Jamal Ghoroghchian - Graduate Coordinator (215)436-2975.

Master of Science in Natural Science - Forensic concentration

Southeastern Missouri State University Cape Girardeau, MO 63701, Dr. Robert C. Briner (314)651-2221

Interdisciplinary program: chemistry, biology and forensic science. Program can emphasize areas where the student is deficient. These research in SEMO Crime Lab. Requirements: 30 credits plus thesis.

Doctoral Programs

At this writing, we have no information on active doctoral programs in forensic science in the US. There are, however, several universities that offer programs on the Ph.D. level with some specialization relating to forensic science. These are given below:

John Jay College (address and contact given above)

Ph.D. in Criminal Justice with a concentration in Forensic Science

University of California - Berkeley (address and contact given above)

Doctor of Public Health with research opportunity in forensic science. There are also Ph.D.'s in Comparative Biochemistry, Genetics, Immunology or Environmental Health with opportunities for research with a forensic science emphasis.

University of Illinois - Chicago (address and contact given above)

Ph.D. in Toxicology with forensic emphasis.

In addition there are a number of universities which offer research emphasis in forensic science as evidenced by recent theses that were forensic science related. They are listed below:

University of Alabama Department of Chemistry Box 870336 Tuscaloosa, AL 354487-0336, Dr. Wolfgang Bertsch

Kansas State University Department of Chemistry Manhattan, Kansas 66506, Dr. C.E. Meloan

Villanova University Department of Chemistry Villanova, PA 19085, Dr. Robert L. Grob

University of Virginia Department of Chemistry PO Box 3425 Edgemont Rd. Charlottesville, VA 22903, Dr. Ralph O. Allen

Graduate Programs Outside the US

INDIA

Master of Science in Forensic Science

University of Madras Department of Forensic Science Tamil Nadu

Punjabi University Patiala 147002, Dr. Rakesh Sharma

University of Sagar Sagar (M.P.)

PHILIPPINES

Master of Science in Criminology

Philippine College of Criminology Manila

Requirements: Minimum 20 units of formal graduate courses, ten units of thesis and oral examination. No graduate credit for courses with grade below 85%. Residency - two semesters minimum. A Fingerprint Science (Personal ID) course is part of the curriculum but information on forensic science courses offered is unavailable. Certificate programs in firearms and questioned documents are offered, so courses in these must be available.

continues on page 22

Human Scent as Evidence

*Ronald L.
Moore*

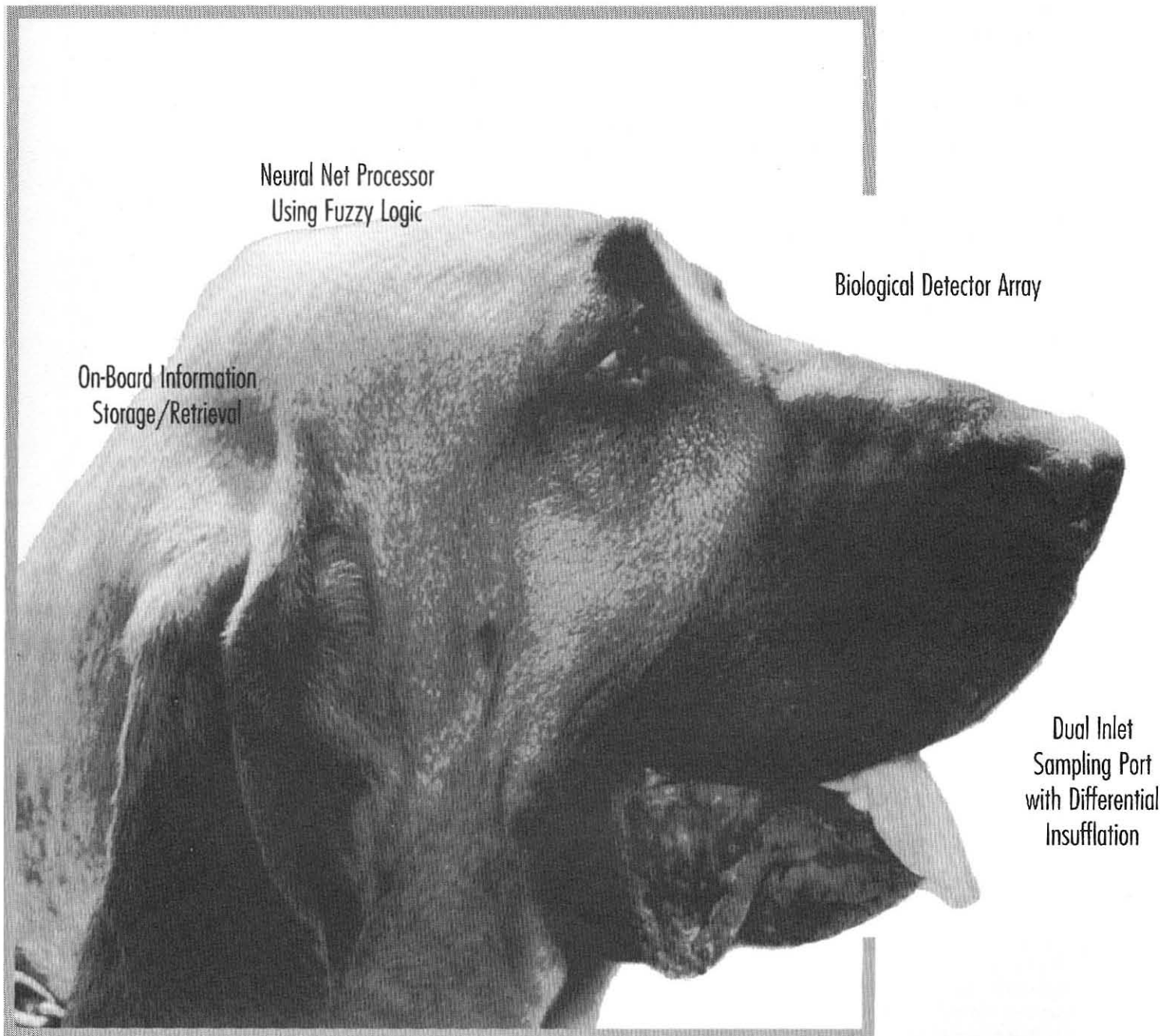


Fig. 1
The Human Scent Detector, Model K-9

Recently we have seen significant advances in two of the primary means of human identification: Fingerprinting and DNA Profiling. With the development of magnetic fingerprint powders, fluorescent powders, alternate light sources, and other developing and visualizing chemicals, as well as computerized storage, search and retrieval, fingerprinting has moved from a patrolman's sideline to a professional science. Likewise, DNA profiling has moved from theory and academia to the crime scene and the courtroom as a vital aspect of physical evidence. But as powerful a means of individualization as they are, they can be thwarted. The canny criminal can avoid leaving at the crime scene either his fingerprints or the progressively smaller amount of cellular material necessary for DNA analysis.

But there is another type of evidence which the suspect leaves at the scene, wherever he goes and on whatever he touches. Not fingerprints, not DNA, but his scent. That scent, while not visible, or even detectable, by human means, can still be a powerful type of evidence if thought is taken as to its proper collection, preservation, and use. For with scent evidence, as with these others, conclusive association is possible.

What is Human Scent

Odor detection is the least well developed sense in humans. Except in extreme cases human scent goes largely undetected by other humans. Some cultures also go to great lengths to mask or eliminate extreme human odors, finding them offensive or embarrassing. Yet under laboratory conditions it has been shown that humans can indeed detect differences in odor from different people when asked to distinguish between articles of clothing by smell alone. This should not be too surprising given that many other species in the wild use scent to individualize other members of the species (mates, pack members, rivals), as well as identify members of other species (prey and predators). It would

seem logical that humans could have retained at least the vestiges of a similar ability to differentiate by scent. Such human scent markers, even if barely detectable to other humans would be easily detectable by other species more dependent on olfactory information.

Research into offensive human odor, as well as studies into sterile operating environments, spacecraft environments, and fabrication/assembly cleanrooms, has led to an understanding of several factors which are believed to give rise to the group of substances we collectively call human scent. Human scent is generally believed to be the volatile products of bacterial decomposition of human skin cells and skin secretions, as well as spontaneously occurring skin volatiles. This is augmented by a plethora of other volatile compounds from soaps, shampoos, perfumes, deodorants, lotions, hairsprays, mouthwashes, foods, drinks and clothes.

The human body is composed of cells, over 60 trillion of them per person. Most of these cells reproduce themselves and are replaced due to wear or aging. Blood cells last about 120 days, the epithelium of the intestine only a few days. The regeneration of the skin is reported to be between 14 and 45 days. Cells in the lower layer of the epidermis, the stratum germinativum, reproduce and move upwards toward the surface, the stratum corneum. As they do so they are progressively flattened and keratinized. By the time they reach the surface the skin cells resemble microscopic paving tiles composed largely of keratin. Also present in the skin are two types of sweat glands (eccrine and apocrine), sebaceous glands, and hair follicles. The number and type of these skin structures varies by location on the body. The skin hosts a complement of resident and transient bacteria as well, which also varies in composition and density with location.

The bacteria live off of the skin cells and secretions of the sebaceous glands, and apocrine and eccrine sweat glands. Sebaceous secretions, which lubricate the skin, are composed of triglycerides, wax esters, squalene, cholesterol esters, and cholesterol. Eccrine sweat, which is produced primarily in response to thermal stress to cool the

body, but also in some areas on the body due to mental stress, is a watery secretion also containing mucoproteins, amino acids, sodium chloride, vitamins, glucose, ammonia, urea, potassium, lactic acid, triglycerides, and free fatty acids. Apocrine sweat, secreted mostly in the armpits and groin, is a slightly thicker watery secretion containing mucoproteins, proteins, pyrodoxose and other carbohydrates, iron, ammonia, peroxidized lipids, and malonaldehyde. Clearly the bacteria live in a very nutritious environment.

These resident bacteria would include various species of *Staphylococcus*, especially *S. albus*, *S. aureus*, *S. epidermidis*, *S. saprophyticus*, as well as *Micrococcus luteus*, *Micrococcus varians*, and *Corynebacterium acnes*. The bacteria produce volatile molecules as a result of the metabolism of skin cells and secretions; volatiles, for example, including but not limited to short chain fatty acids (butyric, caproic, valeric, etc), sulfur containing compounds (hydrogen sulfide, sulfur dioxide, methyl mercaptan), amines (methylamine, ammonia, urea), amino acids, and esters, aldehydes, and ketones. Few of these would be human specific, but the skin secretions also contain certain human specific components such as volatile steroids

Human scent is generally believed to be the volatile products of bacterial decomposition of human skin cells and skin secretions

(androsthenol, androsthenone) and other proteins. This is only a sampling of the over 100 various volatile compounds detected by gas chromatography which are exuded from a human body. Other recently proposed sources of individual specific human scent are cell surface histocompatibility markers or a composite of the many skin secreted lipids with or without bacterial decomposition.

Scent is generally pictured as a

composite of various volatiles. Studies have shown that given a complex odor, that is, an odor composed of multiple ingredients, the perception of that odor will change if even one of the components is altered in concentration relative to the others. Research has also shown that changes of concentration too small to be detected in a single

Through man's long association with the dog there has developed a history of using the dog's sense of smell to man's advantage

compound by itself can affect a change in perception when it is a component of a complex odor. From this we can infer that a human odor might be represented by a mixture of a number of compounds which would be the same for all humans, but would be distinguishable based on the relative differences in concentration. That the relative differences in such a mix of compounds would be a genetically derived unique trait is not too difficult to fathom even if they are produced by skin microflora, given that the processes which give rise to the precursors of these compounds are under genetic control.

If we take the population of the world to be about 5 billion people, for there to be a unique scent for each person would require the presence (or absence) of 33 different compounds ($2^{33} = 8.5$ billion). If 100 compounds were included in that composite it would yield incredibly more combinations (1.27×10^{30}). However this supposes that it is only the presence or absence of each compound that is important. As previously discussed, it is more realistic to consider the relative concentration of the compounds. Setting just five concentration levels reduces the number of compounds required for uniqueness to 14. Clearly

with a large potential number of compounds in a continuous range of concentrations the possibilities for unique combinations is nearly infinite.

While all this may sound very logical and convincing, it still remains just a theory. Much research remains to be conducted to determine just which compounds are important for the detection and discrimination of humans by scent. And while the current theory appears to explain much about observed phenomena, other explanations may also be found.

The Human Scent Detector

Before we can continue to consider human scent theory we must examine the device which is most often used to detect human scent. Let me introduce, if I may be indulged for a moment, what I call the Advanced Qualitative Molecular Detection System, also known as the Human Scent Detector Model K-9. (See Figure 1) The model K-9 features dual inlet sampling ports capable of differential analysis of scent concentration gradients. It has a biological detector array of some 220 million cells in the middle sized unit, about 44 times the human equivalent. The detectors are hard wired to a neural net information storage, search and retrieval system utilizing some pretty fuzzy logic. The unit comes with a user definable command structure and a user friendly interface. It works best with a dedicated operator, and requires extensive training, as well as ongoing quality assurance. On the down side, the units only have a 7-10 year service life. They also drool, shed, and produce waste products. In some ways I guess you could say they are real dogs.

Seriously, the canine has evolved over time and selective breeding to possess a powerful sense of smell optimized for such things as finding food, choosing a mate, and avoiding enemies. Through man's long association with the dog there has developed a history of using the dog's sense of smell to man's advantage in areas from hunting to protecting the flocks. It is estimated that the canine sense of smell is from 200,000 to many million times more sensitive than its human coun-

terpart, depending on the odorant tested. The area of the canine brain dedicated to olfactory stimuli is eight times larger than in humans. It is theorized that the dog derives as much or more information about the world in which it lives from its nose as humans do from their eyes.

With proper training the dog handler can help refine the dogs ability to differentiate human scent. The canine should then be able to reliably discriminate a source of scent as coming from a specific human, to the exclusion of all other humans. This ability can be tested and validated prior to allowing the dog and handler to work cases where the scent discrimination is an issue, as in following criminal trails, or associating evidence to a particular suspect. Some dogs trained for other types of scent work such as obedience or rescue work may not be trained to this level of reliability.

Collection and Preservation of Scent Evidence

For the proper collection and preservation of scent evidence one must keep several factors in mind. The first of which is that (at least as currently understood) it is bacteria on skin cells producing volatile compounds that we believe we are trying to preserve. The second is that the proper preservation of scent may not be the best way to preserve the value of other types of evidence that may be present on the same object. There are procedures to collect scent material from evidence objects while preserving other types of evidence which may also be present. It is also important to remember that scent evidence is transitory and easily contaminated, so efforts to preserve scent evidence should take place early in a crime scene investigation.

Scent may be found on a variety of objects. It is estimated that the human body sheds skin cells at a rate of about 200,000 per minute. There is literally a shower of skin rafts, groups of a couple cells each, falling from the body into the environment. This material is often concentrated in clothing, hats, gloves, bedding, and furni-

ture, including car seats. Scent material may also be deposited on objects which are handled, such as the door handles of houses or cars as well as guns, knives, bats and other weapons, or essentially any other object. Scent material is also present in the oils, proteins, and other skin secretions which make up latent fingerprints. Processing for latent fingerprints will most likely compromise the value of the article for scent purposes, however, so it is important to consider the value of an object as a scent source before fingerprint processing begins. The more porous the object, the longer it was worn or handled, and the more recently the object was worn or handled by one person, the better a scent article it will be. However, non-porous objects should not be eliminated from consideration.

Collecting articles as scent sources should be done by a single person to try to minimize the mingling of the collector's scent with the scent that is being collected. At a minimum the collector should wear fresh latex gloves and avoid touching any part of his body during the collection. If the collector will be available when the scent article is to be used this should be sufficient. If not, additional steps to avoid scent contamination may be in order, such as wearing Tyvek® coveralls with the sleeves and leg openings taped closed, and a surgical type head covering. Scent articles should be collected into clear zip sealing plastic bags and additionally sealed with tape. This should be packaged additionally in an outer container such as a paper bag or second plastic bag and sealed with tape. Normal evidence marking procedures should also be followed, specifically including the name of the collector, date and time of collection, and case number.

Scent articles once collected should be frozen without drying, so as to halt bacterial action without killing the bacteria. Normal procedures for drying wet or bloody evidence prior to freezing in order to reduce bacterial degradation of the blood or fluid evidence is obviously counterproduc-

tive if the evidence is to be used as a scent article. Scent articles should be allowed to thaw and sit at ambient temperature prior to being used as scent articles for scent discrimination in order for the bacteria to have time to resume active metabolism.

In order to preserve the value of other types of evidence such as blood types or fingerprints, the scent may be sampled from the item. This is also the procedure to be followed on items which are awkward or impossible to collect themselves, such as door handles. To collect scent off of an object a fresh sterile gauze pad, commonly a four inch square, is rubbed against the object in order to transfer to the pad a sample of the bacteria, skin cells, and skin secretions. The scent pad may then be sealed and frozen as above. The scent pad may be examined for adhering trace evidence during collection. Specially constructed vacuum devices are sometimes used by specially trained teams to collect scent evidence off of articles where it is preferable not to have to rub the article, for instance a firearm which may also have fingerprint evidence. Sufficient scent transfer may sometimes be effected simply by laying a gauze pad on the scented object for a period of time.

Scent articles should be kept as evidence even in those cases where the article is used to start a dog right at the time of collection. It should then be possible to later validate the scent work of one dog by using a second or more scent specific dogs to also make scent associations.

Uses of Scent Evidence

Canine scent work generally falls into two categories: general and specific. General scent tasks include searching for any person in an area (wilderness air scenting, disaster, avalanche), searching an area for any object bearing human scent (article search), and searching for bodies on land, buried, and in the water (cadaver search). These tasks, cadaver work excepted, are better suited to areas where the amount of human habita-

tion is slight. In these fields a scent article is not required, since the canine is looking for any human scent. Specific scent tasks require a scent article, and the canine is looking for a specific person or matching scent source. Applications for specific scent searching (scent discrimination) are searching for a missing person or trailing a fleeing suspect, picking a suspect from a line-up using a scent article from a crime scene, finding evidence at a crime scene associated with a particular suspect by scent, and associating articles of evidence by scent. While it is possible, and even necessary at times, to find suspects or evidence using general scent trained canines, the real value in scent evidence is in scent specific work. A brief illustration is provided.

Police investigation of a robbery/homicide developed a suspect who was in jail for an unrelated burglary. Detectives had trace evidence associations, but were unable to conclusively place the suspect at the scene. On the suspect's release from jail he left on foot to a nearby shopping mall. Police used a scent specific bloodhound to follow the trail of the suspect using a scent article collected at the scene of the robbery/homicide. If the suspect had no connection to the crime the bloodhound should not have been able to locate a scent trail associated with the scent article. The suspect was arrested based on the scent association between the scent article from the crime scene and the trail of the suspect away from the jail, as well as the corroborating trace evidence.

Author's Note

References may be requested from the author. This is a slightly abbreviated form of the paper I intend to submit for peer reviewed publication, which will be fully cited and referenced.

This paper, voted Most Outstanding, was originally presented at the Fall 1994 CAC Seminar.

Human Hair Individualization: Atlas of Hair Microscopic Characteristics

Robert R. Ogle and Michelle Fox

Introduction

The majority of the microscopic "characteristics" in hairs used for the forensic comparison of human hair were described by Hausman¹. Most of these characteristics are *continuous variates* and therefore each variate will be described differently by various forensic hair examiners owing to the subjective nature of the description jargon. The difference in descriptive terms by the examiners owes its existence to the fact that there is currently no published atlas of archetypes for the variates seen for each of the microscopic characteristics in human hair. Thus, each examiner has a unique classification scheme for describing the particular variate of a characteristic seen in the hair being studied. In order to establish uniformity in the nomenclature for describing the variants in microscopic hair characteristics, it is essential to have a reference atlas which portrays the boundaries for the descriptive terms for the variates (i.e., an atlas of archetypes).

The lack of a uniform classification scheme for the variates of each microscopic hair characteristic has prevented forensic hair researchers from developing data on the frequency of each variate in a study population. A uniform classification scheme relies on a collection of archetypes to which the study specimen can be compared. Since there has been no collection of archetypes to date, the frequency of each microscopic characteristic's variate has not been determined in any study population.

The undetermined frequency of hair characteristic variates extends to any constellation of hair characteristics (the hair type.) The frequency of a given hair type in any population is unknown, therefore, the hair type can neither be determined to be unique to a specific individual nor can an estimate of its frequency in the relevant population be given. It follows that

the first step in determining the frequency of a given hair type in a specific population is to determine the frequencies of the variates of the microscopic characteristics which define the hair type. In order to determine the frequency of a given hair characteristic variate (see Table 1) in a specific population, it is necessary to have a frame of reference for scoring each hair characteristic under study. At the present time, there is no published frame of reference for scoring the characteristics by researchers. This situation is being remedied by the development of a hair characteristic atlas by one of us (Fox). The scoring system in Table I is tentative at the present time and will be fine-tuned as the research for the atlas proceeds. It is anticipated that the atlas will be published both in a text format and in a CD-ROM format for use as a reference text or in computer aided comparisons for scoring the hair characteristics variates.

Hair Types and Archetypes

A hair "type" is defined by the combination of microscopic characteristics found in the hair (the "constellation" of characteristics)². Up to the present time, there has been no objective way to define a hair type. The publication of the *Hair Atlas* will allow for researchers in different laboratories to score the microscopic characteristics in study hairs for frequency studies and also determine the frequency of a given hair type. The hair type frequency can be determined owing to the ability of the researcher to score each characteristic objectively and thus describe the hair type numerically by reference to the score for each characteristic variate and the resultant aggregate score for the hair type. For example, a (1) light brown hair with (2) light density, medium size pigment granules distributed uniformly, (3) a continuous, opaque medulla, (4) medium diameter shaft, (5) no cortical fusi, (6) a serrated cuticular margin, (7) a constant shaft diameter, (8) a streaky cortex, (9) no hair treatment, (10) a natural tapered tip, (11) a 24 centimeter length, (12) slightly wavy and (13) with no cortical inclusions would be expressed numerically as follows:

02-12-22-31-01-02-00-03-01-02-00-01-04-02-01

The hair type defined by the numerical coding is thus in a format which can be sorted rapidly by a computer, while the frequency for both a single characteristic's variate and the hair type in the study population can be computed easily. These data would allow the hair examiner to express both the rarity of each characteristic and the frequency of the hair type in various human populations which have been studied.

Request for Research Specimens

In order to produce an atlas of hair characteristics, it is necessary to have a large base of archive hairs. For this reason, the following request is being made to CAC members (and other readers of the *CACNews*): Please send a sample (about 25 each) of your scalp hair and pubic hair to:

Attn: Michelle Fox
Forensic Analytical Specialties, Inc.
3777 Depot Rd., Suite 409
Hayward, CA 94545

In order to make the hair collection as useful as possible, please include the following data for the donor with the hair specimens:

1. Ethnicity (Please be as specific as possible);
2. Gender;
3. Age;
4. Information on any hair treatments (Products);
5. Name (Optional)

All hair donations will be greatly appreciated and they will greatly benefit the researchers in forensic hair examination.

References

¹Hausman, LA, (1934), "Histological Variability of Human Hair" *Am. J. Phys. Anthro.*, Vol. 18, pp415-429.

²Ogle, R.R., Jr. (1993), "Human Hair Individualization II: Hair Types and Archetypes", CAC, *81st Semi-Annual Seminar*, May 1993, Berkeley, CA.

³Table I adapted from Wickenheiser & Hepworth, *JFSCA*, Vol. 35, No. 6, Nov. 1990, pp1323-1329.

Table I. HAIR CLASSIFICATION CHARACTERISTICS³

1. Color: (macroscopic and microscopic characteristic)

BROWN SERIES	RED SERIES	RED/BROWN SERIES
00 White	00 White	01 With 11 Thru 16
01 Yellow	11 Very Light	02 With 11 Thru 16
02 Light Brown	12 Light	03 With 11 Thru 16
03 Medium Brown	13 Medium	04 With 11 Thru 16
04 Dark Brown	14 Dark	05 With 11 Thru 16
05 Very Dark Brown	15 Very Dark	06 With 11 Thru 16
06 Extremely Dark Brown ("Black")	16 Extremely Dark Red	

2. Color components: pigment characteristics

Density	Size	Distribution
10 Absent	20 Absent	30 Absent
11 Sparse	21 Fine	31 Uniform
12 Light	22 Medium	32 About medulla
13 Medium	23 Large	33 Unilateral
14 Heavy	24 Very Large	34 Clusters

3. Medulla Characteristics:

00 Absent
01 Continuous/Opaque
02 Continuous/Translucent
03 Continuous/Opaque/Translucent
04 Interrupted/Opaque
05 Interrupted/Translucent
06 Interrupted/Opaque/Translucent
07 Fragmentary/Opaque
08 Fragmentary/Translucent
09 Fragmentary/Opaque/Translucent

4. Maximum Diameter:

01 Fine (<0.04mm)
02 Medium (0.04—0.08 mm)
03 Coarse (>0.08 mm)

5. Cortical Fusi

01 Absent
02 Present - root
03 Present - shaft

6. Cuticular margin

01 Smooth
02 Slight serration
03 Serrated

7. Shaft variation

01 Constant
02 Slight / smooth
03 Wide / smooth
04 Slight / abrupt
05 Wide / abrupt

8. Cortical texture

01 Smooth
02 Streaky
03 Very streaky
04 Granular

9. Treatment

00 None
01 Dyed
02 Bleached
03 Curled / permed
04 Other

10. Tip characteristics

01 Natural taper
02 Recent cut
03 Rounded
04 Rounded / frayed
05 Split
06 Crushed

11. Length (macroscopic)

01 <2.5cm
02 2.5 - 7.5cm
03 7.5 - 15cm
04 15 - 30cm
05 >30cm

12. Curl (macroscopic)

01 Straight
02 Slight wave
03 Wavy
04 Slight curl
05 Medium curl
06 Tight curl

13. Cortical inclusions

01 None
02 Ovoid bodies
03 Other

Ed note—

Robert Ogle is the author of a recently updated crime scene investigation manual.

MUTE WITNESSES

The Evolution of Locard's Exchange Principle

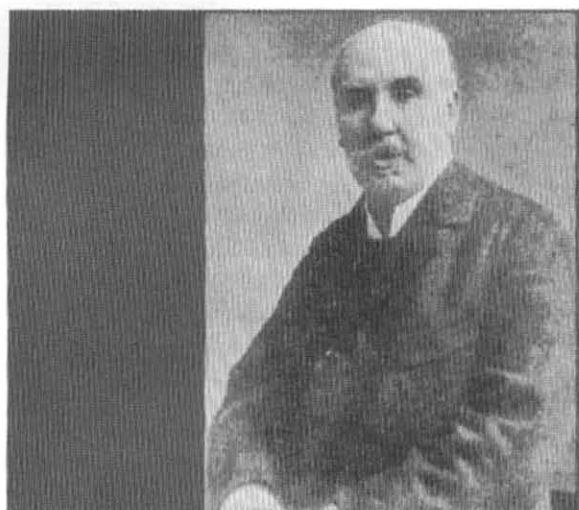
by Edwin L. Jones, Jr.



Right in the middle of the "Trial of the Century", FBI Agent Doug Deedrick explained to the O.J. Simpson jury that, "When two objects come into contact, physical contact, there's going to be an exchange of materials." He went on to say that the origins of this principle were with Locard's work in France. But in reality the origins of the so-called "Exchange Principle" aren't all that clear. In fact, the principle has been stated in several different ways by a number of authors over the decades. I wanted to do a little detective work of my own and see if I could uncover exactly how Locard himself had phrased it.

As early as 1930, Locard authored a three-part article, "*The Analysis of Dust Traces*", which appeared in the *American Journal of Police Science*. No mention of any exchange principle was made. The nearest expression was, "For the microscope debris that cover our clothes and bodies are the mute witnesses, sure and faithful of all our movements and of all our encounters." He gives priority to work on dust as possible evidence to Hans Gross and Conan Doyle. Gross authored the 1893 work "*Manual for Examining Magistrates*" which was subsequently translated to English in 1907 under the title, "*Criminal Investigation*." Doyle is, of course, best remembered as the creator of the master detective Sherlock Holmes. With regard to dust as evidence, Locard further stated, "The main idea, which was embryonic for a long time has been hatched in many places simultaneously, and no one can frankly attribute its paternity to himself." Since Locard refuses to claim the "Exchange Principle", to whom should the honor go?

In Saferstein's "*Criminalistics*" (3rd Ed., 1987) it is noted that "It was Locard's belief that when a criminal came into contact with an object or person, a cross-transfer of evidence occurs (Locard's Exchange Principle)." In "*Techniques of Crime Scene Investigation*" by Svensson, Wendel and Fisher (1981), the idea is presented thus: "When an individual comes into contact with a person or location, certain small seemingly insignificant changes occur. Small items such as fibers, hairs and assorted microscopic debris may be left by the person or picked up by that person from contact with the environment or another individual. In short, it is not possible to come into contact with an environment without changing it in some small way whether by adding to it or taking something away. This concept of change is the so-called Locard Exchange Principle, and is the basis for the study of trace evidence." H.J. Walls was



Top: Edmond Locard, above: Hans Gross.
From Soderman, H. "*Modern Criminal Investigation*", 5th ed. 1962.



Staff of the Lyons Police Laboratory, 1928. Locard is seated third from the left in the front row. His secretary, Maggie Guiral, is just behind him. From Soderman, H. "Policeman's Lot", 1957.

more succinct in his book, "Forensic Science" (1968), when he wrote, "Edmond Locard laid it down as a guiding principle that 'every contact leaves a trace.'" The term Locard Exchange Principle was not even mentioned. Travelling back to 1962, we find L.C. Nickolls, in his work, "Methods of Forensic Science, Vol. 1.", wrote:

Locard's Exchange Principle. During the years 1926 through 1928, Professor Locard of Lyons was describing in his many writings, his exchange principle. This may be briefly summarized as follows: When any two objects come in contact there is always a transfer of material from each object to the other. Often this transfer is obvious, at least in one direction, but even when the amount of material transferred or its nature is such that nothing is visible, there is always some transfer; it is the duty of the forensic scientist to identify the material if at all possible.

But six years earlier, in what may be the very first mention of the term, L.C. Nickolls had written in "The Scientific Investigation of Crime" (1956), under bold type:

"LOCARD'S EXCHANGE PRINCIPLE: The basis of this reconstruction and of contact traces was laid down by Locard (1928), who stated that when any two objects come into contact there is always a transference of material from each object on to the other."

Edmond Locard was born in 1877, retired in 1951 and died in 1966. A prolific writer, he published works from 1902 until 1957. Educated in both medicine and law, he trained under Lacassagne and Bertillon. Alexander Lacassagne was the Professor of Pathology and Forensic Medicine at the University of Lyons and Bertillon was the first person to use science in the form of *anthropometry* (measurements of the human) to identify criminals for the Paris police. Before starting the police labo-

ratory in Lyons in 1910, he traveled to Berlin, Rome, Vienna, New York and Chicago to observe police methodology.

In addition to studying dust, Locard was the inventor and discoverer of *poroscopy*, which individualizes fingerprints based upon the pores in the ridges themselves. He performed painful experiments on his own skin, burning it with hot oil and irons, to show that fingerprints were permanent and heal with the same individual points of identity.

His salary as lab director was small but he was allowed to charge a fee for any questioned document case he processed. Thus he became the most famous and possibly the best QD examiner in France. Author-scientist Harry Soderman, himself a student of Locard from 1926 through 1929, said that Locard was "an exciting man to work for." Soderman was no stranger to academic excellence, having studied organic chemistry with Grignard. In 1940, Locard finished the seventh volume of his treatise on criminalistics—no doubt the most comprehensive treatment of the subject.

Excerpt from "The Scientific Investigation of Crime", by L.C. Nickolls:

A typical case of this type was one of larceny of bronze filter plates from a factory making hydrated manganese dioxide for use in dry batteries. The plates, when they were stolen, were contaminated with this substance. The police officer investigating the case noticed black stains in a motor car and on certain garments and boots; he sent these for laboratory examination. The various articles were extracted and the extracted dust was analysed. The dusts all contained manganese dioxide which, calculated as hydrated manganese dioxide, amounted to from 40 to 80 % of the total weight of the different extracted dusts. This evidence directly associated the samples examined with a source of manganese dioxide and, since manganese dioxide is a substance of very limited use, raised a very strong presumption that the source of the manganese dioxide was the stolen filter plates.

It can be accepted that it is established that any contact between the criminal and the crime will leave a trace. Whether this trace is identifiable will depend partly on the amount of the trace which has been transferred and partly on the nature of the material transferred. In addition Locard showed that trades and professions leave traces in the fingernails, ears and skin folds of a person, as well as on their clothing, which serve to identify them with their occupations. These are called occupational dusts. It is expected that a sweep will be black with soot, or a miller white with flour. Locard went further than this and showed that all occupations which produce any finely divided material in the course of the occupation will leave recognizable traces of the occupation on the person or clothing of the individual. It is the duty of the scientist to find these traces. Examples are fragments of leather and wax on a shoemaker, leather and paper fibres on a bookbinder, talcum and soap dust on a hairdresser or drugs on a pharmaceutical chemist. ■

FIREARMS REFERENCE LITERATURE

*Kim Perkins and Elizabeth Scobel**

On April 27, 1995 we sent 315 letters written by criminalist Bruce Moran to firearms companies throughout the world. The names and addresses were obtained from the Gun Digest (1995 issue). We received 154 responses (49%) which included pamphlets, brochures, posters, and books. These materials have been filed in a handy reference collection to be used by the criminalist doing case work. The materials sent by the ammunition companies were subsequently incorporated into a desk reference for daily use by the criminalists in the firearms section. If you would prefer to have this mailing list on a computer disk, mail us one and we will produce a copy and return it.

Accu-Tek, 4525 Carter Court, Chino, CA 91710
 Air Venture, 9752 E. Flower Street, Bellflower, CA 90706
 Airgun Repair Centre, 3227 Garden Meadows, Lawrenceburg, IN 47025
 Allred Bullet Co., 932 Evergreen Drive, Logan, UT 84321
 American Ammunition, 3545 NW 71st Street, Miami, FL 33147
 American Arms, Inc., 715 E. Armour Road, N. Kansas City, MO 65116
 American Derringer Corp, 127 N. Lacy Drive, Waco, TX 76705
 AMT, 6226 Santos Diaz Street, Irwindale, CA 91702
 Anschutz GmbH, Postfach 1128, D-89001 ULM, Donau, GERMANY
 Armes de Chasse, P.O. Box 827, Chadds Ford, PA 19317
 Armscorp USA, Inc., 4424 John Avenue, Baltimore, MD 21227
 Arrieta, S.L. Morkaiko, Wingshooting Adventures, 5, Elgoibar E-20870, SPAIN
 Auto Ordnance Corp, Williams Lane, West Hurley, NY 12491
 Ballistic Products, Inc., 20015 75th Avenue, North Corcoran, MN 55340
 Barrett Firearms Mfg., Inc., P.O. Box 1077, Murfreesboro, TN 37133
 Beeman Precision Airguns, 5454 Argosy Drive, Huntington Beach, CA 92649
 Benelli Armi, S.p.A., Via della Stazione, 61029 Urbino, ITALY
 Beretta U.S.A., Corp., 17601 Beretta Drive, Accokeek, MD 20607
 Black Hills Ammunition, P.O. Box 3090, Rapid City, SD 57709-3090
 Blount, Inc., Sporting Equipment Div., 2299 Snake River Avenue, P.O. Box 856, Lewiston, ID 83501
 Borovnik KG, Ludwig, 9170 Ferlach, Rahnhoferstrasse 7, AUSTRIA
 Brenneke KG, Wilhelm, Limenauweg 2, D-30551 Langenhagen, GERMANY
 Browning Arms Co., One Browning Place, Morgan, UT 84050
 BSA Guns Ltd, Armoury Road, Small Heath, Birmingham, ENGLAND
 B-West Imports, Inc., 2425 N. Huachuca Drive, Tucson, AZ 85745-1201
 Cabela's, 115 Cabela Dr., Sidney, NE 69160
 Calico Light Weapon Sys., 405 E. 19th Street, Bakersfield, CA 93305
 Cape Outfitter, 599 County Road 206 Dept., COF, Cape Girardeau, MO 63701
 CBC, Avenida Humberto de Campos 3200, 09400-000 Ribeirao Pires, SP Brazil
 Century Gun Dist, Inc., 1467 Jason Road, Greenfield, IN 46140
 Century International Arms, Inc., 48 Lower Newton Street, St. Albans, VT 05478
 Champion's Choice, Inc., 201 International Blvd., La Vergne, TN 37086
 CHARCO, 26 Beaver Street, Ansonia, CT 06401

China Sports, Inc., 2010 S. Lynx Place, Ontario, CA 91761
 Cimarron Arms, P.O. Box 906, Fredericksburg, TX 78624
 Claridge Hi-Tec, Inc., 19350 Business Center Drive, Northridge, CA 91324
 Colt's Mfg. Co., Inc., P.O. Box 1868, Hartford, CT 06144
 Connecticut Valley Classics, P.O. Box 2068, 12 Taylor Lane, Westport, CT 06880
 Coonan Arms, Inc., 1465 Selby Avenue, St. Paul, MN 55104
 Cooper Arms, P.O. Box 114, Steensville, MT 59870
 Cor-Bon, Inc., 4828 Michigan Avenue, P.O. Box 10126, Detroit, MI 48210
 Crosman Airguns, Rt. 5 and 20, E. Bloomfield, NY 14443
 CVA, 5988 Peachtree Corners East, Norcross, GA 30071
 Daisy Mfg. Co., P.O. Box 220, Rogers, AR 72756
 Dakota Arms, HC55, Box 326, Sturgis, SD 57785
 Denver Bullets, Inc., 1811 W. 13th Avenue, Denver, CO 80204
 Dynamit Nobel-RWS, Inc., 81 Ruckman Road, Closter, NJ 07624
 E & L Mfg., Inc., 4177 Riddle By-Pass Rd., Riddle, OR 97469
 Eagle Arms, Inc., 128 E. 23rd Avenue, Coal Valley, IL 61240
 Eley Ltd., P.O. Box 705, Wotton, Birmingham, B6 7UT, ENGLAND
 EMF Co., Inc., 1900 E. Warner Avenue, Suite I-D, Santa Ana, CA 92705
 Euroarms of America, Inc., P.O. Box 3277, 208 E. Piccadilly Street, Winchester, VA 22601
 Federal Cartridge Co., 900 Ehlen Drive, Anoka, MN 55303
 Focchi of America, Inc., 5030 Fremont Road, Ozark, MO 65721
 FN Herstal, Voie de Liege 33, Herstal 4040, BELGIUM
 Freedom Arms, Inc., P.O. Box 1776, Freedom, WY 83120
 FWB, Neckarstrasse 43, 78727 Oberndorf a. N., GERMANY
 Garrett Cartridges, Inc., P.O. Box 178, Chehalis, WA 98532
 Gibbs Rifle Co., Inc., Cannon Hill Industrial Park, Rt. 2, Box 214 Hoffman Road, Martinsburg, WV 25401
 Glock GmbH, P.O. Box 50, A-2232, Deutsch Wagram, AUSTRIA
 Gonic Arms, Inc., 134 Flagg Road, Gonic, NH 03839
 Great Lakes Airguns, 6175 S. Park Avenue, Hamburg, NY 14075
 Grendel, Inc., P.O. Box 560909, Rockledge, FL 32956
 GSI, Inc., 108 Morrow Avenue, P.O. Box 129, Trussville, AL 35173
 G. U., Inc., 4325 S. 120th Street, Omaha, NE 68137
 H & R 1871, Inc., 60 Industrial Rowe, Gardner, MA 01440
 Hammerli USA, 19296 Oak Grove Circle, Groveland, CA 95321
 Hansen Cartridge Co., 244 Old Post Road, Southport, CT 06490
 Hartmann & Weiss GmbH, Rahlstedter Bahnhofstr. 47, 22143 Hamburg, GERMANY
 Hatfield Gun Co., Inc., 224 N. 4th Street, St. Joseph, MO 64501

**Interns presently at Santa Clara Crime Lab., 1557 Berger Dr., San Jose, CA 95112*

Heckler & Koch, Inc., 21480 Pacific Blvd., Sterling, VA 20166
 Hirtenberger Aktiengesellschaft, Leobersdorferstrasse 31, A-2552 Hirtenberg, AUSTRIA
 Holston Ent., Inc., P.O. Box 493, Piney Flats, TN 37686
 Hornady Mfg. Co., P.O. Box 1848, Grand Island, NE 68801
 H-S Precision, Inc., 1301 Turbine Drive, Rapid City, SD 57701
 Interarms, PO Box 208, Alexandria, VA 22314
 Lahn, Kahr Arms, P.O. Box 220, Blauvelt, NY 10913
 K.B.I., Inc., P.O. Box 5440, Harrisburg, PA 17110
 Kent Cart. Mfg. Co. Ltd., Unit 16, Branbridges Industrial Estate, E. Peckham, Tonbridge Kent, TN12 5HF, ENGLAND
 Kimber of America, Inc., 9039 SE Jannsen Road, Clackamas, OR 97015
 Kriehoff Gun Co., 7528 Easton Road, PO Box 549, Ottsville, PA18942-0549
 Lakefield Anns Ltd., 248 Water Street, Lakefield, Ontario, K0L2H0, CANADA
 Lapua Ltd., P.O. Box 5, Lapua, FINLAND SF-62101
 L.A.R. Manufacturing, Inc., 4133 Farm Road, West Jordan, UT 84088
 Ljubic Industries, Inc., 732 N. 16th Avenue, Yakima, WA 98902
 Lorcin Engineering Co, Inc., 10427 San Sevaine Way, Ste. A, Mira Loma, CA 91752
 M & D Munitions Ltd., 127 Verdi Street, Farmingdale, NY 11735
 Magnum Research, Inc., 7110 University Avenue, Minneapolis, MN 55432
 MagSafe Marketing Group (Ammo Co), 2725 Friendly Grove Road, NE Olympia, WA 98506
 MAGTECH Recreational Products, Inc., 5030 Paradise Road, Ste.C211, Las Vegas, NV 89119
 Markell, Inc., 422 Larkfield Center 235, Santa Rosa, CA 95403
 Marksman Products, 5482 Argosy Drive, Huntington Beach, CA 92649
 Marlin Firearms Co., 100 Kenna Drive, New Haven, CT 006473
 McMillan Bros. Rifle Co. Inc., P.O. Box 86549, Phoenix, AZ 85080
 McMillan Gunworks, Inc., 302 W. Melinda Lane, Phoenix, AZ 85027
 MCS, Inc., 34 Delinar Drive, Brookfield, CT 06804
 Men - Metallwerk, Elisenhuetten, GmbH, P.O. Box 1263, D-56372 Nassau/Lahn, GERMANY
 Miller Arms, Inc., P.O. Box 260 Purl Street, St. Onge, SD 57779
 Mitchell Arms, Inc., 3400 W. MacArthur Blvd., Ste. 1, Santa Ana, CA 92704
 MKS Supply, Inc., 5990 Philadelphia Dr, Dayton, OH 45415
 M.O.A. Corp., 2451 Old Caiden Pike, Eaton, OH 45320
 Mossberg & Sons, Inc., O.F., 7 Grasso Avenue, North Haven, CT 06473
 Mowrey Gun Works, P.O. Box 246, Waldron, IN 46182
 Mullins Ammo, Rt. 2, Box 304K, Clintwood, VA 24228
 Navy Arms Co., 689 Bergen Blvd., Ridgefield, NJ 07657
 NECO, 1316-67th Street, Emeryville, CA 94608
 Nesika Bay Precision, 22239 Big Valley Road, Poulsbo, WA 98370
 New England Ammunition Co., 1771 Post Road East, Ste.223, Westport, CT 06880
 North American Arms, 2150 South 950 East, Provo, UT 84606
 Olympic Arms, Inc., 624 Old Pacific Hwy. SE, Olympia, WA 98503
 Para-Ordnance, Inc., 3411 Mc Nicoll Ave, Unit14, Scarborough, Ontario
 Paragon Sales & Services, Inc., P.O. Box 2022, Joliet, IL 60434
 Pardini Armi Commerciale Srl, Via Italica 154, 55043 Lido Di Camaiore, Lu, ITALY
 Penguin Industries, Inc., Airport Industrial Mall, Coatesville, PA 19320
 Perazzi USA, Inc., 1207 S. Shamrock Avenue, Monrovia, CA 91016
 PMC/El Dorado Cartridge Corp., P.O. Box 62508, 12801 U.S. Hwy. 95 S, Boulder City, NV 89006
 Precision Delta Corp, P.O. Box 128, Ruleville, MS 38771
 Ram-Line, Inc., 545 Thirty-One Road, Grand Junction, CO 81504
 Ravell Ltd., 289 Diputacion Street, 08009 Barcelona, SPAIN
 Remington Arms Co., Inc., 1007 Market Street, Wilmington, DE 19898
 Rossi S.A., Amadeo Rua, Amadeo Rossi, 143 Sao Lepoldo, RS, BRAZIL 93030-220
 Savage Arms, Inc., Springdale Road, Westfield, MA 01085
 Scattergun Technologies, Inc., 518 3rd Avenue, S, Nashville, TN 37210
 SGS Importers International, 1750 Brielle Avenue, Unit B1, Wanamassa, NJ 07712
 Shiloh Rifle Mfg., P.O. Box 279, Big Timber, MT 59011
 Sigarms, Inc., Corporate Park, Exeter, NH 03833
 Smith & Wesson, 2100 Roosevelt Avenue, Springfield, MA 01102
 Speer Products, Div. of Blount Inc., P.O. Box 856, Lewiston, ID 83501
 Springfield, Inc., 420 W. Main Street, Geneseo, IL 61254
 SSK Industries, 721 Woodvue Lane, Wintersville, OH 43952
 Star Ammunition Inc., 5520 Rock Hampton Ct., Indianapolis, IN 46268
 Steyr Mannlicher AG, Mannlicherstrasse 1, P.O.B 1000, 4-4400 Steyr, AUSTRIA
 Stoeger Industries, 5 Mansard Ct., Wayne, NJ 07470
 Sturm, Ruger & Co., Inc., Lacey Place, Southport, CT 06490
 Swivel Machine Works, Inc., 167 Cherry Street, Ste. 286, Milford, CT 06460
 Taurus S.A., Fodas Avenida Do Forte, 511, Porto Alegre, BRAZIL
 Thompson/Center Arms, P.O. Box 5002, Rochester, NH 03867
 3-D Ammunition & Bullets, 112 W. Plum Street, P.O. Box J, Doniphan, NE 68832
 True Flight Bullet Co., 5581 Roosevelt Street, Whitehall, PA 18052
 Uberti, Aldo, Casella Postale 43, I-25063 Gardone V.T., ITALY
 U.F.A., Inc., 7655 Evans Road #2, Scottsdale, AZ 85260
 Ultimate Accuracy, 121 John Shelton Road, Jacksonville, AR 72076
 UltraSport Arms, Inc., 1955 Norwood Ct., Racine, WI 53403
 USAC (Rainer Ballistics), 4500-15th Street East, Tacoma, WA 98424
 Valor Corp., 5555 NW 36th Avenue, Miami, FL 33142
 Walter GmbH, Carl, B.P. 4325, D-89033 Ulm, GERMANY
 Weatherby, Inc., 3100 El Camino Real, Atascadero, CA 93422-2544
 Welby and Scott Ltd., Frankley Industrial Park, Tay Road, Rubery Rednal,, Birmingham B45 0PA, U.K.
 Weihrach KG, Hermann, Industriestrasse 11, 8744 Meltrichstadt, GERMANY
 Wesson Firearms Co., Inc., Maple Tree Industrial Center Rt. 20, Wilbraham Road, Palmer, MA 01069
 White Shooting Systems, Inc., P.O. Box 277, Roosevelt, UT 84066
 Wildey Inc., P.O. Box 475, Brookfield, CT 06804
 Winchester Div., Olin Corp., 427 N. Shamrock, E. Alton, IL 62024
 Zero Ammunition Co., Inc., 1601 22nd Street SE, P.O. Box 1188, Cullman, AL 35056

Topic/Title	Author	Issue
"Ethical Discussion—Series II, Number 5	Bell, V.P.	Fall 1990
—No Features—	—	Winter 1991
"Ethical Discussion—Series II, Number 6	Bell, V.P.	Spring 1991
—No Features—	—	Summer 1991
Obituary—John R. Patty	—	Fall 1991
Obituary—John R. Davidson	—	Fall 1991
"Now You See It, Now You Don't, Now You See It"	Blake, M.	Fall 1991
"Alaskan Gasoline"	Beheim, C.	Winter 1991
"Report on Two Early United States Firearms Identification Cases"	Dougherty, P.	Spring 1992
"Bad Science" (Reprint)	Garrison, D.H.	Summer 1992
"Isn't It Just Common Sense? (Reprint)	Cerabino, Frank	Summer 1992
"Enhancement of Faint and Dilute Bloodstains with Fluorescence Reagents"	Maucieri, L. and Monk, J.	Summer 1992
"Murder Most Entertaining"	Matheson, G.	Fall 1992
"Gulflite Formulation Changed"	Pederson, L.	Fall 1992
"Application of a Rewashing Technique to Enhance Absorption-Elution"	Houde, J.	Fall 1992
"A Comparative Study of Blood and Breath Data from the Santa Clara Co. DA's Crime Lab."	Baughman, P.	Fall 1992
"Match Criteria Determination for RFLP DNA Analysis Using Five Molecular Size Zones"	Jones, D., Gregonis, D, Minnillo, D	Winter 1992
"Quashing the DNA Debate" (Reprint)	Schrag, P.	Spring 1993
"No Blarney—Dublin Crime Lab Brings High-Tech to Ireland"	Houde, J.	Spring 1993
"The General Knowledge Exam"	ABC Board	Summer 1993
"Criminalist/Author Ken Goddard's "Digger" (Reprint)	Sykes, E.	Summer 1993
"Beyond A Reasonable Doubt"	Jones, E.	Summer 1993
"Microorganisms in Seized Cocaine Samples"	Houde, J.	Summer 1993
"The Effects of Aerosol Inhalers on Pre-existing Predetermined Blood Alcohol Concentrations Using the Intoxilyzer 5000"	Benson, K.	Summer 1993
"Detection of Rh Antigens in Dried Blood" (Reprint)	Brunelle, R. and Thornton, J.	Summer 1993
Obituary "Charles C. Fulton, Pioneer in Microcrystals, Remembered"	Evans, H.	Summer 1993
"Saliva Mapping"	Houde, J.	Fall 1993
"The Identification of Condom Lubricant Traces on Evidence Items From Sexual Assaults"	Blackledge, R.	Fall 1993
"Distinguished Member Award Recipient Speech"	Murdock, J.	Fall 1993
"Say 'Bye-Bye' to Frye"	Gialamas, D.	Fall 1993
"Analysis of Anabolic Steroids"	Koverman, G.	Fall 1993
"Identification of Mammalian Feces by Coprostanol TLC" (Reprint)	Hoskin, G.	Fall 1993
"Reflections of a First Generation Criminalist" (Founder's Lecture Oct '91)	Osterburg, J.	Winter 1993
"The Persistence of Fingernail Striae with the Passage of Time and Injury"	Haag, L.	Winter 1993
"SITE Program Evaluates Emerging Technologies" (Reprint)	EPA	Winter 1993
"Bringing Forensic Science into the 21st Century"	Moore, R.	Spring 1994
"Forty Years Ago..." (Reprint)	—	Spring 1994
"Some Thoughts on Harm Reduction Related to Drugs"	Shulgin, A.	Spring 1994
"Developing a Laboratory Safety Program for OSHA Compliance"	Baughman, P.	Spring 1994
"Is It Gasoline or Insecticide?"	Gialamas, D.	Spring 1994
Obituary "Professor M. Edwin O'Neill"	Dougherty, P.	Spring 1994
Obituary "Reba Louise Kirk"	Morton, C.	Spring 1994
Obituary "Barry Jakovich"	—	Spring 1994
"Newest 'Bathtub' Designer Drug May Replace Meth Labs" (Reprint)	Staten, C.	Summer 1994

"The Toolmark Signature of the 9mm Luger Caliber Heckler & Koch Semi-Automatic Pistol" (Reprint)	Leisinger, C.	Summer 1994
"Heroin and Opiates— A Refresher Course"	Barber, M.	Summer 1994
"Canine Accelerant Detection Teams: Validation and Certification"	DeHaan, J.	Summer 1994
"Court Order in P. v. Orenthal James Simpson" (DNA Matter)	Ito, L.	Fall 1994
"Simpsonese" (Reprint)	Safire, W.	Fall 1994
"How Much is Enough?"	Houde, J.	Fall 1994
"On the History of Forensic Microscopy"	Jones, E.	Fall 1994
"Some Thoughts on Silencer Determinations"	Peterson, E.	Winter 1994
"Violent Crime Control Act of 1994" (Excerpt)	US Congress	Winter 1994
"A Remedy for PGM Alteration in IEF of EDTA Blood Samples"	Stockwell, D.	Winter 1994
"Report from the NRC Public Meeting"	Inman, K.	Winter 1994
"Gunpowder Atlas"	Jones, E.	Winter 1994
"Street Terms: Drugs and the Drug Trade" (Reprint)	—	Winter 1994
"The Lab Coat as a Status Symbol" (Reprint)	Wharburton, F.	Winter 1994
"Lab Productivity I. Correlation to Snack Shop Visits"	Boone, L. et al	Winter 1994
Obituary "Edward F. Rhodes"	Hunter, C.	Spring 1995
"Frank Cassidy Calls it a Career"	Maucieri, L.	Spring 1995
"Court of Appeal Gives Criminalists a Cure for Ruined Vacations"	Evans, H.	Spring 1995
"Saliva Mapping Followed Up"	Schaeffer, M.	Spring 1995
"Starch Atlas"	Houde, J.	Spring 1995
"A Review of the Trace Metal Detection Technique (TMDT) and the Suitability of 8-Hydroxyquinone as an Investigative Tool"	Burritt, B. and Maucieri, L.	Spring 1995
"Important Laws in Science" (Reprint)	Kohn, A.	Spring 1995
"Our Fifteen Minutes of Fame"	Davis, R.	Summer 1995
"A Request from T & R"	Gialamas, D.	Summer 1995
"The State or Life of Criminalistic Evidence: A Commentary on the Theory of Physical Evidence"		
"Women and the Development of Forensic Science" (Founder's Lecture, Oct 1994)	Hanausek, T.	Summer 1995
"Observations from the Witness Stand"		
"Supreme Court Again Reviews 'Usable Quantity' in Drug Cases"	Pereira, M.	Summer 1995
"TV Cameras in COurt: Time to Rethink?" (Reprint)	Matheson, G.	Summer 1995
"An Interesting Physical Match"	Evans, H.	Summer 1995
"Specificity of Microcrystalline Tests for Heroin"	AP	Summer 1995
"Forensic Biology Sample Collection Techniques: A Look at Methods Utilized by California Crime Labs"	Moran, B.	Summer 1995
"Similarity Between Human and Hyena Hair"	Thornton, J.	Summer 1995
"Human Scent as Evidence"		
"Mute Witness"	Gialamas, D. and Stockwell, D.	Summer 1995
"College and University Programs Graduate and Undergraduate"	Thornotn, J. and Riedel, J.	Fall 1995
"Human Hair Individualization: Atlas of Hair Micro. Characteristics"	Moore, R.	Fall 1995
	Jones, E.	Fall 1995
	Siegel, J. and Midkiff, C.	Fall 1995
	Ogle, R., Fox, M.	Fall 1995

Corrections

The following names were inadvertently left out of the last CAC Membership Directory. An interim release of the directory is planned for early next year which will correct other errors. If you have updates, changes, etc., please contact the Membership Secretary.

Nahum, Alan	Medical-Legal Consultants	8494 El Paseo Grande	La Jolla, CA 92037
Murphy, Ann	Sacramento Co. Lab	4400 V Street	Sacramento, CA 95817
Morton, Charles	Inst. of Forensic Science	2945 Webster St.	Oakland, CA 94609
Murdock, John	ATF Laboratory	355 Widget Lane	Walnut Creek, CA 94598
Muto, Joseph	LA Co. Med-Examiner-Coroner	1104 Mission Rd.	Los Angeles, CA 90033
von Beroldingen, Linton	Oregon State Police	1111 SW 2nd Ave #1201	Portland, OR 97204
Munoz, Manuel	LA Co. Sheriff	2020 W. Beverly Blvd.	Los Angeles, CA 90057
Mumford, Russell	Orange Co. Sheriff-Coroner	320 Flower St.	Santa Ana, CA 92703

Forensic Science Programs

SWITZERLAND

Université de Lausanne Institute de Police Scientifique et Criminologie Place du Chateau 3 CH-1005 Lausanne, Switzerland, Professor Pierre Margot

There are three graduate offerings in forensic science: Postgraduate degree in Chemical Criminalistics Student must hold a bachelor's degree in science or forensic science or qualifications judged equivalent. Instruction is in the French language. Post graduate degree in Questioned Document Analysis Admission requirements same as above Ph.D. in Forensic Science Student must hold a bachelor's degree in forensic science from the Institut or a degree judged equivalent.

UNITED KINGDOM

King's College London Department of Biochemistry Strand London WC2R 2LS, Dr. J.R. Dawson or Dr. N. Spenser

Requirements: The M.S. in Forensic Science involves three course units, each unit including 48 hours of lectures and 96 hours of practical work. In addition, the student undertakes a practical project of 6-8 weeks during the summer. An undergraduate background in chemistry and biochemistry and command of the English language is required for admission to the program.

University of Strathclyde Forensic Science Unit Glasgow, Scotland G1 1XW, Dr. Brian Caddy

Areas of specialization: Forensic chemistry Forensic biology. Requirements: The program is approximately 20 weeks of full time work. There are no formal credits per se but students take courses and, when not in class spend their time in the lab. A research project of about four months is conducted in a working forensic laboratory. Also included is a videotaped moot court, two - three hour theory papers, a week-long practical exam, a report on the research and an oral examination. A Ph.D. program involving a minimum of 33 months of full-time research is available. This program may require three or more years for completion.

UNDERGRADUATE PROGRAMS

Bachelor of Science in Forensic Science

University of Alabama at Birmingham Department of Criminal Justice University Station Birmingham, AL 35294, Dr. Frederick Smith (205)934-2069

California State University - Sacramento School of Health and Human

Services Division of Criminal Justice 6000 J. St. Sacramento, CA 95819, Professor Leo Hertoghe (916)278-6487

The University of Central Florida Forensic Science Program Department of Chemistry Orlando, FL 32816-0366, Dr. William W. McGee - Director (407)275-2246

University of Central Oklahoma Department of Chemistry 100 N. University Drive Edmond, OK 73034, Dr. Terril D. Smith (405)341-2980 x5018

Eastern Kentucky University Forensic Science Program College of Natural and Mathematical Sciences Department of Chemistry Richmond, KY 40475-0950, Dr. Robert E. Fraas - Director (606)622-1456

John Jay College of Criminal Justice City University of New York 445 West 59th St. New York, NY 10019, Dr. Peter DeForest (212)237-8899

Michigan State University School of Criminal Justice 506 Baker Hall East Lansing, MI 48824-1118, Dr. Jay Siegel (517)353-5283

The George Washington University Department of Forensic Science 2036 H. St. N.W. Washington, DC 20052, Charles O'Rear - Chair (202)994-7319

University of Mississippi Department of Chemistry University, MS 38677, Dr. Andrew Stefani (601)232-7301

University of New Haven Forensic Science Program 300 Orange Avenue West Haven CT 06516, Dr. R.E. Gaensslen - Director (203)932-7000 B.S. in Chemistry with Emphasis in Forensic Science
Bachelor of Science in Forensic Chemistry

Ohio University Department of Chemistry Clippinger Laboratory Athens, OH 45701-2979, Dr. James Y. Tong-Director of Forensic Chemistry (614)593-1737
Concentration in Criminalistics

Metropolitan State College Department of Chemistry PO Box 173362 Denver, CO 80217-3362, Ms. Susan Land (303)556-2610

York College of Pennsylvania Department of Chemistry Country Club Road York PA 17401, Dr. Aline Harrison (717)846-7788
BS in Forensic and Toxicological Chemistry

West Chester University Dept. of Chemistry West Chester, PA 19383, Dr. Jamal Ghoroghchian - Graduate Coordinator (215)436-2975. Dual Major - Chemistry and Criminal Justice

Weber State University Department of Criminal Justice Ogden, UT 84408-1206, Dr. Jim Gaskill-Director (801)626-6146

Forensic Science or Criminalistics Concentration in Criminal Justice Program

Albany State College Department of Criminal Justice 504 College Drive Albany, GA 31705, Dr. Samendra Basu (912)430-4864

Weber State University (see above for address)
B.S. in Forensic Investigations

Jacksonville State University College of Criminal Justice Jacksonville, AL 36265, Mr. Robert W. Henson

Note: Program directed toward the user of forensic services; e.g. investigator, police administrator, etc. rather than the provider of such services.

Minor within Other Bachelor's Degree Programs Minor in Forensic Science (within polymer science department)

The University of Southern Mississippi Department of Polymer Science Southern Station Box 10076 Hattiesburg, MS 39406-0076, Dr. Gerald Mattson-Associate Chair (601)266-4868
Minor in Forensic Science within Criminal Justice

St. John's University Department of Criminal Justice Grand Central and Utopia Parkways Jamaica, NY 11439, Chair (718)990-6161

York College of Pennsylvania Department of Chemistry Country Club Road York PA 17401, Dr. Aline Harrison (717)846-7788

Undergraduate Programs Outside the United States

AUSTRALIA: **University of Technology** - Sydney P.O. Box 123 Broadway NSW 2000 Australia, Professor Robert Breakspear - Dean, Faculty of Physical Sciences

GERMANY: **University of Humboldt** Department of Forensic Science Berlin, Germany

PHILIPPINES: **Philippine College of Criminology**, Manila, Philippines, Mr. Process T. Tubid

POLAND: **University of Cracow** Department of Criminalistics Cracow, Poland
SWITZERLAND: **Université de Lausanne** Institute de Police Scientifique et Criminologie Place du Chateau 3 CH-1005 Lausanne, Switzerland, Professor Pierre Margot

UNITED KINGDOM: **University of Strathclyde** Forensic Science Unit Glasgow, Scotland G1 1XW, Dr. Brian Caddy.

TRAINING & RESOURCES VIDEO

(CAC Members Only)

SEROLOGY

Back to Basics Series:

- Electrophoresis Basics — Ron Linhart
- Glycogenated Vaginal Epithelia — Ed Jones
- TAPE 1: • Erythrocyte Acid Phosphatase — Berni Rickard
- Phosphoglucosmutase — J. White / M. Hong
- Haptoglobin — David Hong
- TAPE 2: • Immunology — David Stockwell
- TAPE 3: • Gm / Km — Stockwell / Wrxall
- 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
- TAPE 9: • Statistics — M. Stamm

Also available:

- Population Genetics & Statistics Course, Dr. Bruce Weir**
Eight two-hour tapes, PLUS the course notebook.
- Bloodspatter Lecture — Fall '92 CAC Meeting (Knowles)**
- Bloodspatter Lecture — J. Chisum**
- Micro. Exam. of Sex Assault Evidence — Ed Jones**
- DNA Workshop — Spring 1993 CAC Meeting, 4 Tapes**

GENERAL INTEREST

- ABC News 9/23/91: "Lab Errors"
- CBS News 4/27/92: "Animation Reconstruction"
- Alex Jason / Jim Mitchell: "Trial Animation"
- TAPE 1:
- TAPE 2: • 48 Hours 9/25/91: "Clues"

- Founder's Lectures by:**
- Stuart Kind — Fall '93
 - Walter McCrone — Spr '90
 - J. Osterburg — Fall '91
 - Lowell Bradford — Spr '93

"Against All Odds — Inside Statistics" (13hours)
Forensic Alcohol Supervisor's Course

FIREARMS / 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**
- Footwear Mfg. Tour — Van's Shoes**
- Glass Methods — Bailey / Sagara / Rhodes**
- Forensic Firearms Evidence — L. Haag**
- Deadly Effects: Wound Ballistics — A. Jason**
- Fibers — Mumford/Bailey/Thompson**

Please address requests to

Dean Gialamas, T&R Chair
c/o Cal Lab of Forensic Science
3890 Prospect Ave. Ste. A
Yorba Linda, CA 92686

Farcus

by David Waisglass and Gordon Coulthart

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"That's right ... someone broke in, cleaned up and put away files."

Farcus

by David Waisglass and Gordon Coulthart

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"Would the jury foreman kindly refrain from starting another wave."

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- Membership in a prestigious Forensic Society!

1. Contact the CAC Membership Secretary, **Lisa Skinner** (408)299-2224 to obtain an information packet and application.
2. Fill out and return the application to Lisa along with your first year's dues and application fee.
3. Two of the individuals listed by you as references will be contacted.
4. Applicants are screened to ensure that they meet the requirements. (Outlined in Article 11 of the *CAC Membership Handbook*)
5. Your application will be presented to the Board of Directors at their next quarterly meeting. If approved by the board, your application will be presented to the membership for a vote at the next CAC Seminar.



If you
lived
here,
you'd be
home
now.



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Milpitas

The CAC Founder's Lecture will feature *Douglas M. Lucas*, former director of the Centre of Forensic Sciences, Ministry of the Solicitor General, Toronto, Ontario, Canada



Santa Clara Crime Lab for Spring '96

Raymond Davis, Seminar Chair (408) 299-2224