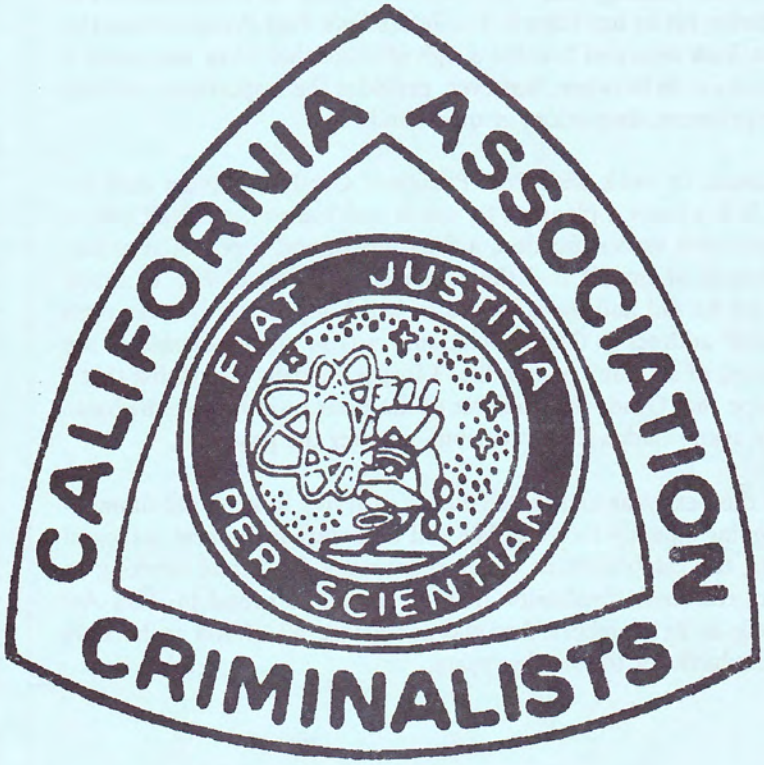
# Newsletter

## California Association of Criminalists




OCTOBER , 1989

# A MESSAGE FROM THE PRESIDENT

Every Spring the Association starts anew with a new President and some new faces and, hopefully, some fresh minds on the Board of Directors. This is always a time to reflect on what has been accomplished in the past year and to plan for what we hope to accomplish in the coming one. The President-Elect, as I can vouch, has very few formal duties during his or her tenure. The Immediate Past President has the primary duty to sit, listen, look wise and breathe a sigh of relief that he or she made it through the year. The position in between, however, provides the opportunity to help guide the Association to progress, stagnation, or quicksand.

I have been fortunate to work with Past President Grady Goldman and the recent Board members. It has been a pleasure to watch and learn as we dealt with a number of new challenges such as certification, a fiscal crisis, and a potential generous gift of funds. On behalf of myself and the Association, I would like to thank Grady for the excellent job he did and the standard he set. I appreciate his role even more after my first "official" address to the Association. I was so uncomfortable at the thought of speaking in front of so many people that I forgot virtually everything that I had intended to say. I hope that Grady and the rest of the Board will forgive my haste and failure to adequately acknowledge their contributions over the past year.

I look forward to the next year and the challenge of trying to keep the momentum of the Association going steadily forward. We will be entering the next stages of certification, investigating the establishment of an endowment fund, and working to ensure that Criminalistics remains a profession that we can all be proud of. This Association is only as strong as its members. I would encourage all of you to become involved in setting the standards for the coming years.

Sandy Wiersema

# UPCOMING PROFESSIONAL MEETINGS

CALIFORNIA ASSOCIATION OF CRIMINALISTS October 19 - 21, 1989 The Fall 1989 Seminar of the California Association of Criminalists will be held at the Irvine Marriott, Irvine, California from October 19 - 21, 1989. The seminar will feature a bloodspatter workshop, a hair examination tutorial, an "alternate viewpoint" panel which will discuss cases in which differences of opinions have arisen, and a panel on professionalism in forensic science. For further information, contact Carol Rhodes, California Laboratory of Forensic Science, 17842 Irvine Blvd., Suite 224, Tustin CA 92680. (714)669-9461.

NORTHWEST ASSOCIATION OF FORENSIC SCIENTISTS October 17 - 20, 1989 The Fall 1989 Meeting of the Northwest Association of Forensic Scientists will be held October 17 - 20, 1989, at the Concord Hilton in Concord, California. Tentative plans at this time include workshops on PCR, drug pharmacology, bombs and booby traps at clandestine laboratory sites, and the use of personal computers in the crime laboratory. For further information, contact Roger A. Ely, Chairman, DEA Western Laboratory, 390 Main Street, Room 700, San Francisco CA 94105.

INTERNATIONAL SOCIETY FOR FORENSIC HEMOGENETICS October 18 - 20, 1989 The 13th International Congress of the International Society for Forensic Hemogenetics will be held in New Orleans, LA, from October 18 through 20, 1989. For further information, contact Dr. Herbert Polesky, Memorial Blood Bank Center Minneapolis, 2304 Park Avenue South, Minneapolis MN 55404.

SOCIETY OF FORENSIC TOXICOLOGISTS October 18-21, 1989 The Annual Meeting to be held at the Ambassador West Hotel in Chicago, IL. For further information contact the 1989 S.O.F.T. Information Center, 1013 Three Mile Drive, Grosse Pointe Park, MI 48230-1412

THE 11TH INTERNATIONAL CONFERENCE ON ALCOHOL, DRUGS AND TRAFFIC SAFETY October 24-27, 1989 This meeting will be held in Chicago and is sponsored by the National Safety Council. For further information contact Al Lauersdorf, T-89 Secretary, National Safety Council, 444 N. Michigan Avenue, Chicago, IL 60611

CALIFORNIA ASSOCIATION OF TOXICOLOGISTS November 4, 1989 This meeting will be held in San Diego and hosted by Dick Shaw. For further information, contact Lee B. Knight, CAT Vice President, Memorial Healthtech Laboratories, 701 E. 28th Street, Suite 113, Long Beach CA 90806. (213) 595-3427

PAN AMERICAN ASSOCIATION OF FORENSIC SCIENCES November, 1989 The Fourth International Meeting of the Pan American Association of Forensic Sciences will be held in Bogota, Columbia. The theme of the meeting is "The Sciences and Justice." For further information, contact Dr. Egon Lichtenberge, Carrera 11 A 96-26, Bogota, Columbia.

THE AMERICAN ACADEMY OF FORENSIC SCIENCES February 19-24, 1990 The 42nd Annual Meeting to be held at the Clarion/Hyatt Regency Hotels and the Cincinnati Convention Center in Cincinnnati, OH. For Further information contact Anne H. Warren, P.O. Box 669, Colorado Springs, CO 80901-0669

THE NATIONAL ORGANIZATION FOR THE ADVANCEMENT OF BLACK CHEMISTS AND CHEMICAL ENGINEERS April 9-14, 1990 The NOBCChE's 17th annual national meeting to be held at the San Diego Hilton Beach and Tennis Resort. For further information contact Mr. Robert L. Countryman (619) 482-2041

# JOB OPENINGS

*Job openings are obtained from a variety of sources. Given publication deadlines and delay in receiving announcements from other parts of the country, some of the openings announced here may be filled by the time this Newsletter is received. Job announcements will normally be run only one time. Members actively seeking employment are encouraged to contact the editorial secretary for information about openings which become available between newsletters.*

**CRIMINALIST/SENIOR CRIMINALIST**

The Orange County Sheriff's Department has several openings at the Criminalist and Senior Criminalist levels. Qualifications include a Bachelor's Degree in Criminalistics, Chemistry, Biology or a related field. The Senior Criminalist requires two years of experience in a forensic laboratory. The monthly salary range is $2,206 - $2,966 (Criminalist) and $2,881 - 3,881 (Senior Criminalist). For further information, contact Margaret Kuo, Forensic Science Services, Sheriff's Department, P.O. Box 449, Santa Ana CA 92702, (714)-834- 4549

**CRIMINALIST**

The Los Angeles Police Department Crime Laboratory is currently seeking qualified applicants for several Criminalist positions. Qualifications include a Bachelor's Degree in Criminalistics, Biological Science or Chemistry; or full-time paid experience as a Criminalist (Forensic Chemist) may be substituted on a year-for-year basis for up to a maximum of two years of the required education. The salary ranges for the three pay grades in this class are $2818 to $3500, $3220 to $4000, and $3486 to $4334 a month. For further information, contact the Personnel Department, Room 100, City Hall South, 111 E. First St., Los Angeles, CA 90012 (213) 485-2442

**CRIMINALIST/SENIOR CRIMINALIST**

The Los Angeles County Coroner's Office has immediate openings at the Criminalist and Senior Criminalist levels. The successful candidate will be trained in Coroner's crime scene investigation and scanning electron microscopy. The minimum requirements for the entry level position include a Bachelor's Degree in Criminalistics, Chemistry, Biology, or a related field. The Senior Criminalist position requires two years experience in a Forensic Laboratory. The monthly salary range is $2439 - $3020 (Criminalist); $3102 - $3948 (Senior Criminalist). For further information, contact Joseph Muto, Forensic Science Laboratories, Department of Chief Medical Examiner-Coroner, 1104 N. Mission Road, Los Angeles, CA 90033 (213) 226-8037

# Abstracts of the Spring 1989 Meeting of the Northwest Association of Forensic Science

**"An Efficient Method for Isolation of Cocaine Free Base From Case Samples"**

Lewis M. Bolf, II Los Angeles County Sheriff's Department, Los Angeles, CA

Recent changes in the California State narcotics legislation placed cocaine free base in a separate schedule from all other forms of cocaine, thereby making it necessary to distinguish cocaine free base from the salt forms of this drug.

**"Juice, The Jock and The Bearded Lady: A Discussion of Anabolic Steroids"**

John Bowden, CA. Department of Justice / California Criminalistics Institute, Sacramento, CA

Anabolic steroids are becoming more and more the object of drug abuse, particularly among college and high school athletes. They are classed as controlled substances in California, Florida and Texas and have recently been the subject of US Federal legislation. This paper discusses the abuse potential and nomenclature of the anabolic steroids. Analytical data will be presented for screening by thin layer chromatography and for confirmation by gas chromatography / mass spectrometry for a number of these compounds.

**"Species Identification by Isoelectric Focusing Analysis of Keratin"**

Donna J. Butler, Peter R. DeForest and Lawrence Kobilinsky; John Jay College of Criminal Justice

Keratins represent the principal structure proteins of hair. They are also found in horn, nail, claw, hoof and feather. Hair and nail samples from human and canine sources and hair samples from mule deer, white tail deer, cat, moose, elk, antelope, caribou, racoon and goat were studied. Parrot and goose feathers were also analyzed. Keratins are polymorphic and species differences are known to exist. Proteinaceous extracts of deer and antelope antlers and bovine and rhinoceros horn were prepared by solubilizing 10 mg. of horn samples in 200 uL of a solution containing 12 M urea, 74 mM Trizma base and 78 mM dithiothreitol (DDT). Extraction took place over a 48 hour period. A 25 uL aliquot of extract was removed and incubated with 5 uL of 0.1 M DDT for 10 minutes at 25 degrees Centigrade. Keratins were then separated by isoelectric focusing on 5.2% polyacrylamide gels for 3 hours and visualized using silver staining. At least 20 bands could be observed for each species studied. However, band patterns differed in the position of each band, in the umber of bands and in band coloration. Horn from two species of rhinoceros was examined. For both specimens, most bands occurred in the pH range of 4-5. Although similar patterns for both species were observed, they differed sufficiently to differentiate one from the other. The closer two species are related phylogenetically, the greater the similarity in the IEF pattern produced from their solubilized keratin. Ten samples were removed from each species item under study and every sample was extracted and run on an IEF gel. Approximately 50 keratin extracts from each species were analyzed by IEF.

**"Species Identification in Cooked and Processed Meats"**

Deborah Ann Collins, University of Wyoming; Richard McCormick, Animal Science - University of Wyoming; and Tommy D. Moore, Wyoming Game and Fish Department.

Various species of cooked and processed wild game meat were tested using isoelectric focusing on polyacrylamide gels, with carrier ampholytes, pH 5-8, and agar overlay staining for adenylate kinase (AK) and creatine kinase (CK) enzymes. Cooked mule and white-tailed deer were differentiated from other species using AK. Uncooked deer, pronghorn, moose, and domestic sheep were differentiated from beef, elk, goat, red deer and caribou using CK. Both pork and buffalo could be distinguished from all game and domestic species tested. Deer, pronghorn and elk, the three most common big game animals hunted in Wyoming, could be separated from each other using both the AK and CK staining. Cooked or raw mixtures of beef and elk or sheep and pronghorn could not be separated using current techniques. Further work will investigate other enzymes suitable for species identification.

**"The Forensic Examination of Phenyl-2-Propanone Synthesized From Phenylacetic Acid and Acetic Anhydride or Lead Acetate"**

Andrew Allen, American University; Roger A. Ely, Pegy Stevenson and Susan Nakamura, DEA Western Laboratory - San Francisco, CA

Phenyl-2-propanone (P-2-P) which is synthesized in clandestine laboratories from phenylacetic acid and acetic anhydride in the presence of sodium acetate, or from the dry distillation of phenylacetic acid and lead (II) diacetate is examined. These two routes are inspected using capillary gas chromatography (GC) with vapor phase Fourier transform infrared (FT/IR) and mass spectrometry (MS) detection to identify many of these reaction by-products. The synthetic mechanisms of the two reactions are presented along with the mechanisms giving rise to the by-products.

**"The Mode and Tempo of DNA Sequence Evolution in a Sea Urchin Actin Gene: Application to the Development of Species Specific Oligonucleotide Probes for Use in Wildlife Forensics"**

Dr. Steven R. Fain, Department of Molecular Genetics and Cell Biology - University of Chicago.

The Nucleotide sequence has been determined for pLvAI, a cDNA clone of the sytoskeletal actin CyI of the sea urchin Lytechinus variegatus. The clone is 1.83 kilobases long and contains more than 97% of the coding region and all the 3-prime untranslated region of the gene. The manner and rate of evolution of this gene was examined by aligning the L. variegatus CyI sequence with sequences for CyI in the related taxa L. pictus, Tripneustes gratilla and Strongylocentrotus purpuratus. Sequence divergence ranged from 4.4% between L. variegatus and L. pictus to 6.3% between L. pictus and S. purpuratus. Silent substitutions occurred in 9.0% - 15.6% of the codons compared, whereas 1.4% - 4.1% underwent replacement substitution. There were several localized regions of variability in the second and third exons of CyI, and this variability increased as comparisons were extended into the 3-prime untranslated region of the gene. Computer simulation of hybridizations between the four CyI sequences and oligonucleotide probes selected from the localized variable regions of the L. variegatus CyI gene identified several probes with potential for discriminating species identity in dot-blot assays.

**"Attempts to Determine Frozen Storage Time for Game Meat"**

R.A. Field and R.J. McCormick, University of Wyoming; and Tommy D. Moore, Wyoming Game and Fish Department

Biceps femoris muscles from elk were studied: 1) 2 hours postmortem; 2) 1 week postmortem at 0-3 degrees followed by 3 weeks frozen storage at -30 degrees Centigrade; and 3) 1 week postmortem at 0.3 degrees followed by 3 years frozen storage at -30 degrees Centigrade. Frozen muscles were then thawed at room temperature before being quenched in liquid nitrogen, sectioned using a cryostat and stained with NADH tetrazolium reductase. No differences in intensity of stain for Type I dark staining fibers was apparent among the three treatments. Therefore, NADH oxidoreductase - from elk muscle retains much of its activity after 3 years and intensity of stain cannot be used to determine length of frozen storage. When fresh muscle was compared with frozen thawed muscle, differences in muscle fiber shape and amount of interstitial space between muscle fibers was apparent but the differences were not consistent and could not be related to frozen storage time. Because depth of freezer burn increases with frozen storage, unwrapped beef steaks were placed in seven different freezers varying in temperature and air velocity and stored 6 months. Large differences in depth of freezer burn and weight loss occurred making it impossible to determine length of frozen storage by measuring depth of freezer burn. In addition, color or the ratio of myoglobin to metmyoglobin would have varied with variation in amount of freezer burn so color of exudate from the frozen-thawed steaks would also be unacceptable as a measure of frozen storage time. In summary, methods to determine how long meat has been frozen are needed by game enforcement agencies and meat industry quality control personnel, but to date attempts to determine length of frozen storage have not been successful.

**"Forensic Application of DNA Fingerprinting to Endangered Species: Hyacinth Macaws"**

Lisa Forman, Jodi Kriss, Kathleen Sheridan, Virginia Fristoe and Robin Cotton; Research Laboratory - Cellmark Diagnostics.

Poaching, smuggling and other illegal trade activities place already endangered species into even more precarious positions. Breeding programs based on legally obtained captives provide the public with legitimate access to rare species. However, offspring are often difficult to produce and are in high demand. Individuals involved in the illegal transfer of IUCN red-listed species often rely on the inability of officials to distinguish the questioned animal from its legitimate counterparts. We have be applying DNA identification method to several investigations focused on the hyacinth macaw, Andorhynchus hyacinthinus, a neotropical parrot whose status is imperilled in the wild. We demonstrate Mendelian patterns of inheritance of hypervariable DNA minisatellites in hyacinth macaw pedigrees using the Jeffreys' multilocus probes 33.15 and 33.6. We are this able to determine whether or not a particular bird is the product of a legitimate mating. Additionally, we are using DNA fingerprinting as a means of identifying birds whose ownership is disputed. Our talk describes the methods we are employing in these investigations and discusses the broader implications of our work in both forensic and conservation arenas.

**"Identification of Sex of Source of Hairs of Game Animals by Sex Chromatin Dimorphism Using Conventional Histological Techniques"**

Janet M. Hough and Dr. Robert Kitchin; University of Wyoming

We are using methods of forensic identification of hair that have previously had human application. With these methods we are attempting to modify and adapt said techniques for the forensic identification of animal hairs. Present research is concentrated on freshly plucked hair samples. Future research will be to determine the effects of time and various environmental conditions on animal hair. Next phase of research will be the use of muscle tissue samples for sex identification.

**"Fatty Acid Profiles: A Potential Method to Differentiate Wild From Cultured Fish"**

Michael Jahncke and Gloria Seaborn, NMFS - Charleston Laboratory; and Theodore I.J. Smith, SCWMRD

Research has been initiated to identify a biochemical technique to differentiate wild from cultured fish. The major objective is to develop a method using the edible portion of the flesh. This paper will discuss the use of fatty acid profiles as a method to distinguish wild from cultured fish. In this study, both cultured and wild fish were examined. The cultured fish were pond-reared using commercial techniques at SCWMRD's Waddell Mariculture Center, Bluffton, South Carolina. The fish were hatched in captivity and fed a commercially available trout diet or an experimental 40% fishmeal diet. Fifty to sixty fish are currently being collected four times a year from four major South Carolina river/lake sites. This information will be used to document the fatty acid profiles of wild striped bass and its hybrids based on their size, sex, maturity, season, physiological condition and site of capture. Lipids were extracted with chloroform-methanol. Fatty acid methyl esters were prepared by reaction with BF3/methanol following saponification. The esters were analyzed by GLC on a 30 M by 0.25 mm ID DB-225 open tubular column. As expected the levels of linoleic acid (18:2n6) found in the cultured bass lipids reflected those found in their respective diets. Linoleic acid concentration ranged from 11.4 - 12.2 percent in cultured fish fed the commercial trout diet compared with 3.1 - 4.3 percent concentrations in wild fish. This difference can be explained since soybean meal is used as a major ingredient in fish feeds, and soybean oil contains approximately 64% linoleic acid. The fish fed the 40% experimental fishmeal diet, on the other hand, had linoleic acid concentrations of 5.7 - 6.6%. These fish could still be separated from wild fish based on differences in linoleic acid, linolenic acid (18:3n3), arachidonic acid (20:4n6) and other long chain polyunsaturated fatty acid concentrations. Fatty acid profiles of cultured red drum and five additional species of wild fish will also be presented.

**"DNA Fingerprint (Genotype) Analysis of Big Game and Other Animals"**

L. Kirby, H. Thommasen, M. Thomsom, P. Hickson and M. Yedlin; University of B.C.

We have carried out preliminary studies on the application of recombinant DNA techniques (fingerprinting or genotyping) to the field of big game and other animal identification. Single-locus multi-allele and multi-locus multi-allele probes were hybridized to DNA fragments from deer (Odocileus spp.), moose (Alces alces) and elk (Cervus spp.) as well as human and domesticated animals, mongrel dogs, Holstein-Friesian cattle and thoroughbred horses. Banding patterns were analyzed manually and with an automated autoradiogram scanner mated to a computer such that spectra of fingerprint band relative locations were produced and measurements of the resolved peaks determined. Distinct patterns were obtained for the different animal species as well as animals within each species; however, as anticipated identical genotype patterns were produced from different tissues within the same animal. Although our numbers are small and some autoradiogram bands are difficult to resolved manually, the concept of DNA fingerprinting wildlife or domesticated animal tissues for poaching - e.g., correlating a freezer steak with a bush gut pile or other identification purposes is a valid one. Additional specific probes must be developed as well as allele sizes and frequencies determined for different animal populations. Data processing can be readily accomplished using an autoradiogram scanner coupled to a computer network. This will facilitate print comparisons with probability determinations for in-house analysis, laboratory exchanges or court proceedings.

**"Forensic Recovery of Buried Bodies and Scattered Skeletons: More Than A Backhoe and Plastic Bags"**

Gary A. Knowles, Oregon State Police Crime Lab - Medford

A detailed and methodical approach to the recovery of human remains yields more than just a collection of bones. Careful exhumation of a body and meticulous scrutiny of the scene, both above and below ground, may lead to more evidence than might otherwise be found. Techniques in finding the grave site, recovering the bones, proper documentation and diagramming are examined.

**"Molecular Genetic Studies of Endangered Species"**

Jonathan L. Longmire, Genetics Group - Los Alamos National Laboratory

We are using molecular genetic methodologies to investigate several aspects of the biology of two endangered species; the peregrine falcon (Falco peregrinus), and the whooping crane (Grus americanus). Techniques used in these studies include molecular-cloning of minisatellite, heterochromatic tandem repeat, and unique DNA sequences, Southern blot analyses, DNA sequencing, and DNA fingerprinting. The primary goal of our peregrine research is to identify and develop a series of stably inherited DNA polymorphisms to facilitate relationship studies between individuals and between geographically distinct populations. Progress to date includes the use of DNA fingerprints to determine maternity, paternity, and sibship, as well as the molecular cloning of DNA sequence probes that allow genetic differentiation of southern hemisphere races of the peregrine. The major goal of our crane study is to generate individual specific DNA fingerprints for each of the approximately forty whooping cranes currently housed at the Patuxent Wildlife Center, and to use these fingerprints to quantitate degrees of relatedness between individuals. Information generated by this work will be used to pair adult cranes in a manner that maximizes genetic outbreeding, hence optimizing genetic diversity and fitness in resulting offspring.

**"Elemental Composition of Bullet Lead"**

Robert K. Koons, Forensic Science Research Unit - FBI Academy

In instances when microscopic comparison of bullets by the firearms examiner is not conclusive, elemental composition may be used to determine whether two bullets have a common source. A study has been undertaken to evaluate the significance of elemental concentrations for comparison of hardened lead bullets. For this study, four boxes of .38 caliber lead, round nosed bullets from each of the four major manufacturers in the United States were selected and each bullet analyzed in triplicate. The concentrations of antimony, arsenic, and copper were determined using neutron activation analysis (NAA) and these elements plus bismuth, silver and tin were determined using inductively coupled plasma-atomic emission spectrometry (ICP-AES). The study was designed to answer questions including the analytical reliability of NAA and ICP-AES, the compositional variability of bullets within a box a sold to the consumer. Discussion of the answers to these questions will consider what statements can be made concerning bullets of similar composition and how this can be used in those cases when the firearms examiner cannot relate a bullet to a particular weapon.

**"Species Identification of Contraband Materials by Radioimmunoassay"**

Jerold M. Lowenstein, University of California

Prosecution of importers of contraband wildlife materials often requires positive identification of tissues such as skin, horn or dried genitalia. A solid phase radioimmunoassay (RIA) has been employed to identify materials being illegally imported or sold as sea turtle penis, tiger penis, seal penis or rhinoceros horn, skin or blood. This RIA technique was originally developed for detecting the tiny residual amounts of protein remaining in fossils. Several hundred antisera have been made to albumins, collagens, transferrins or whole sera of a wide variety of mammals, birds, reptiles, amphibia and fishes. The assay is sensitive enough to distinguish between closely related species such as black and white rhinoceros. In a number of instances, authentic looking rhinoceros horns have proved to be confected of bovine tissue or some inorganic substance.

**"Hair Transfers in Sexual Assault Evidence: A Six Year Case Study"**

Mary Jacque Mann, M.F.S.

Associative head and pubic hair transfers can provide a circumstantial connection between persons and objects in sexual assault cases. The occurrences of reported hair transfers in one analyst's case work are presented.

**"Identification of Sex of Source of Game Blood and Meat Using DNA Probes"**

Steve Menke, University of Wyoming; and Tommy D. Moore, Wyoming Game and Fish Department

We are using human DNA probes from a gene involved in sex determination, designated ZFY, to isolate the homologous genes from deer, elk, and antelope genomic libraries currently being characterized. Probes developed from restriction analysis and sequencing of these homologues will be used in an assay for sex identification of tissue samples by the Wyoming Game and Fish Department. The assay will use polymerase chain reaction amplification of sample DNA and analysis of its restriction patterns with the isolated battery of labeled sex-specific probes.

**"Differentiation Between Fresh and Frozen-Thawed Game Muscle and Estimation of Length of Time Frozen"**

Lura J. Morgan-Renk and Richard McCormick, University of Wyoming; and Tommy D. Moore, Wyoming Game and Fish Department

Frozen-thawed muscle from domestic beef, mule deer, elk and pronghorn showed a 4-10 fold increase in activity of beta-hydroxyacyl-CoA dehydrogenase (HADH) over fresh-unfrozen muscle. The spectrophotometric assay is used on press juice from the meat aged up to 14 days and thoroughly trimmed prior to analysis. A second test using cellulose acetate electrophoresis with specific enzyme staining for glutamic-oxaloacetic transaminase (GOT) shows qualitatively whether muscle has been frozen. The release of a mitochondrial-bound GOTm as a result of freezing is detected as a second distinct band, while unfrozen meat shows only one dark staining band. Estimation of length of time in frozen storage of six different elk muscle samples held frozen one-half to four and one-half years could not be done. Protein solubility, extractability, ATPase activity and percent moisture showed no progressive changes during length of time frozen. Post mortem handling conditions prior to freezing, animal difference or freezing conditions have a greater effect on these parameters rather than length of time of frozen storage.

**"Results of Time of Death Studies in Deer After Five Years"**

James O. Pex and Kenn D. Meneely, Oregon State Police Game Division

For the past five years, the Oregon State Police Game Division has utilized the Crime Laboratory TOD kits for estimation of time of death in blacktail deer. This method utilizes eye fluid glucose and deep muscle tissue. Method of reporting and case observations will be discussed.

**"Genetic Marker Studies in Bighorn Sheep (Ovis canadensis)"**

Laurie E. Rawlinson and Brian Wraxell, Serological Research Institute; David Jessup, James Banks and Kenneth Levine, California Department of Fish and Game

This report presents materials, methods and results compuled in an ongoing research project conceived and sponsored y the California Department of Fish and Game. The goals of this project are to build an adequate genetic database to support investigations into potential inbreeding and herd health problems and to attempt to distinguish races of Big Horn from one another and Born Horn sheep from varieties of Domestic Sheep. To date 537 selected Bighorn Samples have been phenotyped in several blood grouping systems including PGM, EsD, GLOI, EAP, AK, 6PGD, PepA, Hb, CAII, PGI, Tf and SOD. These samples included representatives from five (5) subspecies; O.c. californiana, canadensis, cremnobates, mexicana and nelsonii. Eighty-nine (89) samples from four (4) pure breeds and one (1) mixed variety of Domestic Sheep were also grouped for comparison. Polymorphism was detected in GLOI, Tf, and CAII in Bighorn Sheep. Domestic Sheep were polymorphic in the Hb, Tf and PGI systems. SOD appears to distinguish Bighorn from Domestic Sheep and further isolelectric focusing research will be presented in a second presentation.

**"DNA in Hair: Quantity and Quality"**

Rhonda Kay Roby, Sean Walsh, Cecilia von Beroldingen and George F. Sensabaugh,Forensic Science Group, School of Public Health - University of California, Berkeley

The amount of DNA extracted from hair roots with and without sheath material and from hair shafts has been measured by ethidium bromide staining of agarose gels and by fluorometric analysis. The quality of DNA i these samples has been evaluated by gel electrophoresis. Plucked hairs retaining sheath material contain mostly high molecular weight DNA. Single hairs without sheath, whether plucked or shed were found to contain too little DNA to allow quality assessment. DNA isolated from pooled hair shafts contain some high molecular weight DNA and substantial quantities of low molecular weight nucleic acid. Southern blot analysis has revealed the presence of both mitochondrial DNA and genomic DNA sequences.

**"Electrophoretic Identification of Fillets and Other Processed Fishery Products"**

James B. Shaklee, Washington Dept. of Fisheries; and Clive P. Keenan, Queensland Dept. of Primary Industries

There is an increasing need for techniques to identify processed fishery products for: 1) monitoring and assessing fishing activities, 2) enforcing existing laws and regulations, 3) inspecting and certifying products in the wholesale and retail trade, and 4) protecting the consumers of raw and cooked products. We use a system of starch-gel electrophoresis and subsequent enzyme-specific histochemical staining to detect and visualize the isozyme patterns expressed in fresh (and frozen) fish muscle. We use slab polyacrylamide-gel electrophoresis with subsequent genreal protein staining to characterize the patterns of water-soluble proteins in uncooked fish muscle. We also use the slab polyacrylamide-gel electrophoresis system with subsequent general protein staining to characterize the heat -stabile parvalbumins found in fish muscle extracts. The parvalbumins generally exhibit species-specific electrophoretic patterns and allow the

identification of fish products that have been cooked. Provided that enough exnzymes and/or general proteins are analyzed, the resulting biochemical profiles are unambiguously species specific. We have compiled a database of isozyme, parvalbumin and general protein profiles for over 150 species of commercially harvested fish and shellfish in Australia. The procedures are simple, fast, inexpensive and at least as sensitive as isoelectric focusing. The methodology lends itself to computerized analysis of the resulting electrophoretic patterns so that interpretation can be standardized and automated. The techniques can be applied to marine and/or freshwater fish and shellfish species from virtually any geographic region once a suitable library of reference standards has been established. (These studies were conducted at the CSIRO Division of Fisheries Research Laboratory at Cleveland, Queensland, Australia while both authors were employed by this organization.

**"Application of Recombinant DNA Techniques to the Analysis of Non-Human Species"**

Robert R. Sheehy, Genetics Department, University of Arizona

Biological and forensic examinations of non-human species have often been hampered due to a lack of informative polymorphism at the level required. Morpholoic or biochemical analysis may, under certian constraints, prove ineffectual i providing answers to the questions asked. The analysis of DNA provides a powerful method which compliments existing tools used in addressing these questions. The use of recombinant DNA techniques has been widely applied to human populations in addressing questions of the genetic constitution of individuals in deical diagnosis, for the determination of parentage in cases of disputed paternity, for forensic appkications in the identification of individuals and in anthropological studies of human evolution. The properties of DNA which make it attractive for these types of studies are its relative availability, stability and its variability at many levels. The use of DNA as a substate for study, unlike protein analysis, does not rely on a small number of expressed genes, but opens the whole genome to analysis. These same techniques can be applied to non-human organisms to directly address questions of species identity, sex, population of origin, identification of individuals and for paternity analysis. The application of these techniques to non-human speices will be presented with examples of sex determination, identification of individuals and paternity analysis. Aprroaches to the identification of species and population of origin using these techniques will also be discussed.

**"An Evaluation of the HemeSelect Immunochemical Test of the Identification of Human Bloodstains"**

Thersa F. Spear and Sharon A. Binkley, Alameda County Sheriff's Department Criminalistics Laboratory

The HemeSelect test (distributed by Smith-Kline Diagnostics, Inc.) is used to detect low levels of blood in fecal samples for the diagnosis of gastrointestinal disorders. The test utilizes fixed chicken erythrocytes which are coated with an anti-human hemoglobin antibody. The assay is preformed in a microtiter plate and the results are read visually. Fresh and aged human bloodstains, bloodstains stored under a wide variety of conditions, human body fluid stains (e.g. semen, saliva) and animal bloodstains were assayed with the HemeSelect Kit. This immunochemical assay was found to be specific and more than two orders of magnitude more sensitive than the species test utilizing countercurrent-immunoelectrophoresis. The HemeSelect test is simple and easy to interpret. This test would be especially useful in identifying minute bloodstains which are sometimes encountered on a washed knife blade or bullet or very old bloodstains.

**"Nuclear Magnetic Resonance to Differentiate Bear, Pig, Cow, Sheep and Prong Horn Antelope Bile for Forensic Investigation"**

J.H. Theis, Dept. of Medical Microbiology. School of Medicine - University of California, Davis; J.S. de Ropp, NMR Facility, School of Medicine, University of California - Davis; and R.G. Schwab, Dept. of Wildlife and Fisheries Biology, University of California - Davis

Nuclear Magnetic Resonance (NMR) spectroscopy has been utilized to study the molecular structure of compounds for many years. In a molecule such as bile, the individual protons exist in different chemical environments and, hence, each has slightly different frequency of absorption, termed chemical shift. The particular frequency of nuclear energy absorption, expressed as ppm of shift, is hcaracteristic of the chemical environment of each proton. By comparing the NMR signal of an unknown bile sample with that produced by bile molecules of known molecular structure, we have deteremined which peaks in the unknown proton NMR spectrum result from the influence of neighboring atoms. We have developed a library of spectral profiles of known bile molecules from standards and different animal taxa anc can differentiate the species of origin from the signals recorded in the 2.8 - 4.2 ppm chemical shift range. We have subjected bile to freezing, high temperature and drying and found that none of these physical processes interfere with the molecular structure. The preparation of the bile sample for analysis is simple and does not involve chemical treatment. Adequate signal to noise ratios can be achieved with as little as 5 - 10 minutes of scanning. We have used this technique to successfuly prosecute the unlawful sale of bear bile in California.

**"Direct Sequencing of Mitochondrial DNA from Museum Specimens"**

W. Kelley Thomas, Svante Paabo, Francis X. Villablanca and Allan C. Wilson, University of California - Berkeley

The advent of the polymerase chain reaction has opened up the possibility of sequencing DNA from old tissue specimens. Combined with the presence of museum specimens collected in population samples over the last 100 years, this new technique has opened up the possibility of following genetic changes in populations over long periods of time. In this study, specimens of the panamint kangaroo rat Dipodomys panamintinis from localities representing each of the thress subspecies were examined. A total of 63 museum specimens oringinally collected and prepared as dried skins in 1911, 1917 or 1937 were included. For each specimen a 250 base pair segment of the mitochondrial D-loop was amplified by the PCR and directly sequenced. The same populations were then re-sampled today and compared to the old ones. The possibilit of directly studying the history of molecular variation allows us to gain insights into the relative effects of factors such as population size and migration on the maintenance of variation in natural populations.

**"A Hypertext-Based Firearms Evidence Information System"**

John I. Thornton and Ferdinand G. Rios, Forensic Science Group, University of California - Berkeley

The Forensic Science Group at the University of California, Brkeley, is currently developing a hypertext-based firearms evidence sourcebook, under a grant from the National Institute of Justice. The concept of hypertext is one where windows on a computer screen contain textual or graphical material for which links are established to other textual or graphical information. As most of the currently available information retrieval systems extend the methodologies originally developed for manual systems, they simply replicate linear methodologies which are quite limited. A hypertext system provides a truly hierarchial basis of information retrieval, allowing intricate branching and browsing which better emulates the functionality of the human mind than traditional linera models. The computer version of the Firearms Sourcebook will accomplish two principle goals, that of (1) bringing into a common focus the very fragmented discipline of firearms identification, and (2) providing an evaluative component relevant to each of the various topics discussed. The hypertext system will allow hierarchial branching from one node of information to another related node, the ability to backtrack through the path of information, and direct location of general topics as will as specific references. A fully abstracted bibliography will be included, as well as links to full text versions of certain important references.

**"Amplification of Y Chromosome-Specific Sequences in Biological Evidence"**

Cecilia von Beroldingen and George F. Sensabaugh, Forensic Science Program, University of California - Berkeley; Linton von Beroldingen, CA. Dept. of Justice, Bureau of Forensic Services, Santa Rosa Regional Laboratory; Russel Higuchi and Henry A. Erlich, Dept. of Human Genetics, Cetus Corporation

Determination of the sex of the donor of a biological evidence sample may be valuable in any investigation in which the identity of the donor is in question. The Polymerase Chain Reaction (PCR), which amplifies specific target sequences many million fold, provides a simple and rapid method to detect the presence of human male DNA even in samples in which the DNA may be degraded or present in minute amounts. We have amplified a 149 bp segment of a 3.4 kb repeat sequence which is specific to the Y chromosome and is present in as many as several thousand copies in male DNA. The presence of the 149 bp Y-specific PCR product is readily detecable by gel electrophoresis. No such product is observed when female DNA is amplified with Y-specific primers. We have applied this method of sex determination to the analysis of a variety of samples, including bloodstains, vaginal swabs, saliva and single hairs.

**"The Differentiation of Domestic Sheep and Bighorn Sheep Using the Enzyme Superoxide Dismutase (SOD)"**

Brian Wraxall and Laurie Rawlinson, Serological Research Institute; James Banks, Kenneth Levine, and David Jessup, CA Dept. of Fish and Game

As a result of an ongoing research project regarding Genetic Marker Studies in Bighorn Sheep, it was noticed that a potential difference existed between domestic sheep and Bighorn Sheep when utilizing the enzyme Superoxide Dismutase (SOD). A project was undertaken to optimize the separation using a variety of techniques. This paper will describe the results of those experiments using isoelectric focusing. The analysis of different subspecies of Bighorn Sheep and many different breeds of domestic sheep will be discussed. Stains of varying ages have been typed and these results together with some work on tissue samples will be presented.

**"Electrophoretic Differentiation of Alaskan Dall Sheep and Mountain Goat"**

James R. Wolf, Alaska State Scientific Crime Detection Lab

Alaskan Dall Sheep and Mountain Goat typically both react with commercial anti-sheep antisera. In an effort to differentiate these two species, meat or blood smaples were screened through 9 different enzyme or protein systems (A1B, PGI, AK, EAP, PGD, EsD, CAII and MPI) using cellulose acetate electrophoresis. Preliminary results indicate that the electrophoretic mobility of Mannose Phosphate Isomerase (MPI) is different for Dall Sheep and Mountain Goat and should be suitable for separating meat samples from the two species. The other 8 enzymes exhibited electrophoretic mobilities indistinguishable between Dall Sheep and Mountain Goat. MPI activity was detected only in meat extracts and not in blood.

**"Dental Stone Casting of Snow Impressions at Sub-Zero Temperatures"**

James R. Wolf and Chris Beheim, Alaska State Scientific Crime Detection Laboratory

Snow impression casting techniques using sulfur, Snowprint Wax (TM) with dental stone and gray auto spray primer with dental stone (with and without an accelerator) have been compared. The most cost and time effective method is that of using an initial spray of gray auto primer followed by dental stone. Dental stone casts with good resolution of snow impressions can be made if particular care is taken to cool the stone to below 32 degrees and to cool the mixing water to the sluching point. Potassium sulfate is used as an accelerator in the mixing water at varying concentrations depending on the temperature (up to 10% at -10 degrees). At low temperatures, the cast may freeze before setting up. This usually does not affext the cast as long as it is not disturbed while being thawed out. The gray primer not only helps in photographing the original impression, but also provides some support to the sno matrix (enhancing resolution) and increases detail contrast in the finished cast.

# Leonarde Keeler

# 1903 - 1949

by **JON ARNOLD**

Leonarde Keeler was a great California Criminalist, someone who contributed greatly toward "A Century of Progress" in American criminalistics, and one of those who helped spread August Vollmer's concept of "the scientific policeman" to the rest of the nation.

Keeler was one of the two great pioneers of the polygraph, and although polygraphs are not technically a branch of criminalistics, but rather of criminology, they played an important role in the development of the whole science. In the early days of American criminalistics they brought a great deal of publicity to the field, and generated much public enthusiasm for the whole idea of bringing scientific methods to bear on problems of law enforcement. They also represent a very uniquely Californian contribution to the history of American criminology and criminalistics. Forensic ballistics only started to come into its own in 1924-1925, and the Los Angeles Crime Lab was established in 1925. But the polygraph goes all the way back to 1921.

The son of Berkeley's most celebrated playwright, Leonarde Keeler, very early became entranced (as did so many others) with the magnetic personality of his father's friend, Chief Vollmer. Procedures were far looser in the early 1920's, and Vollmer was more than happy to let the young Eagle Scout roam around police headquarters at will.

Vollmer was very much intrigued with the idea of bringing scientific methods to bear on the problem of detecting deception in criminal suspects. Much theoretical groundwork had been laid during and prior to the First World War, and the spring of 1921, Vollmer commissioned young medical student named John Larson to assemble an apparatus that would continuously record blood pressure, pulse rate, and respiration. It was the theory that a person engaging in deceptive responses to questioning would show identifiable irregularities in these three physiological functions. Larson assembled his apparatus, and it was only a matter of time before the fame of the "Berkeley Lie Detector" spread across America.

The lab apparatus that Larson assembled has something of the mad scientist panache about it, and it was only natural that an inquisitive youngster like Keeler should become much intrigued by it. In due time, he had built his own miniature version of Larson's device, and was gleefully testing female classmates in the basement of his high school. That, unfortunately, will have to remain the subject of a separate article! Larson took a linking to Leonarde and made him his understudy.

Using Larson's apparatus, Keeler broke his first murder case at age nineteen. When in 1924 Vollmer was brought to Las Angeles to head the police department (for what Keeler later described as "an intensive year of cleaning up"), young Leonarde and two classmates followed. Keeler, as was pointed out by his colleagues, C. D. Lee, was always interested in "improved instrumentation", and he brashly asserted to Vollmer that he could build a better device than Larson's. Having nothing to lose, Vollmer told him to go ahead.

The device that Keeler came up with did not look very promising. In fact, it struck Vollmer as nothing more than "a bunch of old soup cans". It did indeed look like something a child might have built with his erector set. But wit worked. Overnight, the amazing young Keeler and his "Emotograph" were making headlines across Los Angeles. Within a year more than four hundred suspects had been examined. And, as the headlines indicated, more than a few murderers fell by the wayside.

All of this was good news for young Keeler, but it remained his dream to produce the device that we would now identify as the first modern polygraph. Something solid, something reliable, something that could be taken anywhere. A device that would be head and shoulders above a mere collection of delicate glass tubes and crude rubber balls just sitting on a table waiting for the next earthquake to strike. And, above all, something that would record blood pressure, pulse rate, and respiration with a precision never before available.

And so it happened that the year 1926 saw the introduction of the first Keeler Polygraph. A handsome little machine, it was the first patented forensic polygraph, but only the second to utilize a motorized chart drive, the "Emotograph" having been the first. Three inked styluses marked a chart rolling out of the left side, and these in turn were activated by two blood pressure cuffs and a pneumograph tube spilling, tentacle-like, out of the right side of its mahogany case. The instrument could record all functions with fine detail. A special

extra stylus marked the chart when a question was asked. It was, in the words of Keeler's sister, "the first professional polygraph."

When Keeler patented his device he was a psychology student at Stanford, and although he later gave much credit to Professor Sherman Miles and others, the concept, as always, was entirely Leonard's. The real genius of the device lay in the fact that Keeler was finally able to replace the unreliable rubber tambours with metal bellows, which in turn activated styluses that could do far more than crudely record minimal curves by scratching a line onto smoked paper, as had been the case with the Larson instrument.

Equipped with this device (sixty were made in the first lot), Keeler moved from being simply a whiz kid to being a serious professional. He started to carry a gun. At about that time, someone was stealing books from the Berkeley law library, and it took only the threat of bringing Keeler into the case for the books to magically reappear overnight! His name was becoming one to be reckoned with.

But Keeler by this time had been called to work at the Institute for Juvenile Research in Chicago. The day he got off the train was February 14, 1929. St. Valentine's Day. "Seven hoods shot in garage!" screamed the newsboys. It was the day of St. Valentine's Day Massacre, an event that was to loom portentous for the future of American criminalistics. But for all Keeler knew, it had nothing to do with him. Chicago, after all, had a reputation for such things.

Had Keeler, however, been a historian writing in the year 1989, he would have known well that the St. Valentine's Day Massacre was to bring about the establishment of the Scientific Crime Detection Laboratory of Chicago, that fabulous crime busting organization that was to set the pattern for all American crime labs developed since. It was also to be the direct inspiration for the famous FBI Laboratory. The wealthy men who funded the Chicago lab made a very wise decision in appointing as its director the renowned firearms expert LTC. Calvin H. Goddard. When it came to selecting topnotch personnel to staff his laboratory, Goddard had a real knack for making the right choices. Leonarde Keeler was one of his first recruits.

Since the lab was affiliated with Northwestern University, Goddard had to fudge Keeler credentials a bit and make him a Stanford graduate, something he was not to become until the age of twenty-seven. Probably a good move, because Keeler was to become so valuable to the work of the laboratory that Goddard once confided in a memorandum that he feared that if he ever lost Keeler, his laboratory would be out of business. By the summer of 1930 the lab was fully operational and more than up to its neck in work, what with a major new gang war that was then raging. Keeler was to prove a very valuable adjunct in the investigation of the shooting case of Chicago Daily Tribune reporter Jake Lingle, who was murdered in a railway station that June.

Although the mild, professorial Keeler was not adverse to staring down even the toughest gangsters, handling their cases was not really his cup of tea. He had long been intrigued with the idea of incorporating into his polygraph a device that would enable him to measure the enigmatic phenomenon of the electrical conductivity of the skin, and its changes in relation to emotional stress. Not surprisingly then, he was overjoyed when his friend Charles Wilson, an electrical engineer, agreed to join the lab and become his full-time assistant. Wilson immediately set to work on what was later to become famous as the Galvanic Skin Reflex, or GSR attachment.

1930 was quite a year for Keeler. His best friend was working with him, and he was engaged to be married to Goddard's secretary, Katherine Applegate. She was a budding understudy to the great document examiner, Albert Osborne. And although he was the polygraph and deception expert par excellence, Keeler lost no time in familiarizing himself with all aspects of the laboratory's operation, and in making himself an accomplished general criminalist. This training was later to stand him in very good stead.

Keeler was by this time quite a darling of the media, although the newspapers sometimes made the aggravating mistake of crediting Goddard with the invention of his polygraph. Keeler was good PR, and it is not surprising that when the lab opened an exhibit at Chicago's 1933 Century of Progress exhibition, he was chosen to run it. But just as the Northwestern lab really got rolling, the Great Depression intervened to knock it down and almost out. Funding dried up, and Northwestern was forced to officially absorb the private corporation. By mid-1933, staffing was cut down to what appears to have been only Keeler, Wilson, and a chemist. Goddard was released as director.

By 1935, however, the laboratory was resurgent, and Keeler was made unofficial director. He was joined by the brilliant young legalist Fred Inbau, and, with Wilson hard at work on the GSR, the three men made up a veritable polygraph powerhouse. Under Keeler's tutelage, the laboratory was once again full service, and was to become a very lean and efficient operation, and one that would even today receive very high marks for administration.

But the polygraph was still probably generating the lion's share of the revenue producing casework, and Keeler spent a great deal of his time perfecting such techniques as the "Card Test", and the very important "Peak of Tension" test. Thousands of polygraph cases were handled at Northwestern. Confessions were copious, and only a very tiny fraction of their judgments were ever proven to have been erroneous. The FBI had decided unanimously to adopt his device in 1934, and throughout his lifetime, Keeler was the brand name in polygraphs.

It is at this point that one can really assess the contribution of Leonarde Keeler to American criminalistics. All the evidence seems to indicate that throughout the 1930's Northwestern was to maintain its position as the country's pre-eminent research laboratory, keeping its lead even in the face of the burgeoning FBI lab, which had a much larger staff and caseload. If you were a budding young criminalist at that time, you still wanted to work for Northwestern. In addition, the lab edited the Police Science section of Northwestern's prestigious Journal of Criminal Law and Criminology. So Keeler deserves much credit for almost singlehandedly shepherding the lab through the often dark days of the 1930's. As if he wasn't busy enough, he and his wife still found time to go canoeing in French Guinana!

It was to all to come together for him in 1939 when he was able to introduce the Keeler Model 302 Polygraph. The Model 302 was the first to fully incorporate the GSR attachment, and its design has set the standard for the industry ever since. Its enclosed bellows system is still the heart of every successful modern mechanical polygraph.

But just as Keeler was reaching the apex of his career, he was to find his steps dogged by tragedy. After suffering adverse publicity in a case involving a man scheduled to be executed, he developed high blood pressure. Marital problems soon followed, and his wife left him to marry an Argentine stunt man. On top of it all, when Northwestern was forced to sell the lab to the Chicago Police Department, Keeler was not retained as its director, possibly because of his lack of outstanding credentials. He was forced to go into private practice, hanging out his shingle as Leonard Keeler Inc. - Personnel Consultants.

All these problems were to contribute to his early death at age forty-seven, but the last ten years of his life were hardly unproductive. Not many criminalists have ever become movie star, but Keeler was to appear alongside Jimmy Stewart in the movie Call Northside 777, a classic of Chicago journalism. The movie dramatized a famous case of a man falsely imprisoned, and since it was Keeler's polygraph chart that finally set him free, he was asked to play himself in the movie. He was also to do much valuable work for the War Department, and as a criminologist for the State of Illinois. In 1949 he founded the International Society for the Detection of Deception. After his death, he became the subject of a lurid local radio show, The Hidden Truth. His polygraph institute only went out of business this year.

It would take a book to fully describe and capture the flavor of the life of the amazing "Nard" Keeler, and indeed, books have been written about him. He was to come a long way in twenty short years, but at the Berkeley police station they still fondly remembered him as the kid who just liked to hang around.

His portrait still hangs proudly on their wall.

# An Ethical Discussion

by **PARKER BELL**

Several years ago Peter Barnett wrote a series of ethical dilemmas for the C.A.C. Newsletter. Many of his hypothetical cases stimulated a great deal of discussion within the C.A.C. over the interpretation of different sections of the Code of Ethics. Some members have missed such discussion in the past few years, and the following hypothetical is offered in the hope that such lively discussions can be revived.

Facts: A homicide has occurred in a bar. At trial two different versions of the events emerge: under the prosecution theory the facts would support a first degree murder conviction; the testimony of the defendant would support a finding of self defense. The trial ends with a hung jury. The prosecution then retains a criminalist to review the evidence and advise the prosecutor whether either story is consistent with the physical evidence. The defense counsel retains a different criminalist for the same purpose. Both criminalists rely upon the crime scene description, photographs and diagrams to reach their conclusions. Neither believes that it would be necessary or beneficial to conduct any analytical tests on any of the evidence.

The criminalist retained by the prosecution reaches the conclusion that either version would be possible. The criminalist retained by the defense attorney concludes that only the prosecution theory is not possible, but the defendant's story is consistent with the physical evidence. After obtaining the permission of the defense counsel to do so, the criminalist retained by the defense contacts the criminalist retained by the prosecution to discuss the bases for their relative opinions. The prosecution criminalist refuses to meet with the criminalist retained by the defense, stating that since the matter is set for retrial and since the prosecutor had made an offer of settlement to the defense attorney, it was up to the defense attorney to decide if the offer would be accepted or not. Therefore, it would not be appropriate for the criminalists to discuss the case. The criminalist retained by the defense is offended by this attitude and feels that it is inappropriate for a criminalist. He then drafts a letter to the prosecution criminalist in order to document his offer to discuss the case; his purpose is to aid the defense attorney in cross-examining the prosecution criminalist, to show his bias. The letter reads as follows:

Dear Mr. X:

This letter will document our recent telephone discussions. I called you and indicated that it appeared that we had a difference of opinion in the homicide reconstruction in this case. I offered to meet with you and discuss the case in an effort to see if we could resolve our differences. You indicated that you would not meet with me. If your recollection of these events differs from mine, please advise me.

Sincerely,

Y

The prosecution criminalist responds with the following:

Dear Mr. Y:

In reference to your letter, please be advised that my recollection differs from yours.

Sincerely,

X

Issues: The C.A.C. Code of Ethics provides (Article IV, Section C) as follows:

*It shall be regarded as ethical for one criminalist to re-examine evidence materials previously submitted to or examined by another. Where a difference of opinion arises, however, as to the significance of the evidence or to test results, it is in the interest of the profession that every effort be made by both analysts to resolve their conflict before the case goes to trial.*

Does the refusal of the prosecution criminalist to meet with the criminalist retained by the defense constitute a violation of this section? Or is the section only intended to apply to differences of opinions relating to analytical results, or only to those situations where one or both of them has actually analyzed the evidence? If, for example, there is a difference of opinion between two criminalists as to whether a brown powder is heroine, the jury is in a poor position to determine which of them to believe. If the issue is, instead, homicide reconstruction, the criminalists ought to be able to articulate their reasons to the jury in terms that the jury can understand. On the other hand, if criminalists give differing interpretations of events based on the same facts, such disagreements do not reflect well upon the profession.

A second issue is whether the criminalist retained by the defense has acted improperly in attempting to "set up" the prosecution criminalist by documenting his re-

fusal to discuss the matter with the purpose of putting the prosecution criminalist in a bad light before the jury. Is his refusal to discuss the case a proper issue for the jury to consider, or is it an merely attempt to create a false impression in the minds of the jury that the prosecution criminalist should not be believed; i.e., is it an effort to convince the jury for reasons not related to the interpretation of the physical evidence itself?

Perhaps relevant to this second issue is Article III, Section H, which provides:

The criminalist will not by implication, knowingly or intentionally, assist the contestants in a case through such tactics as will implant a false impression in the minds of the jury.

If the defense uses the work of the criminalist in documenting the refusal of the prosecution criminalist to discuss the differing interpretations, does this imply that the prosecution criminalist is afraid to discuss his opinion and therefore such opinion is less reliable? Would the acts of the criminalist retained by the defense be of the type covered by Article IV, Section E, which provides:

It shall be ethical for one of this profession to serve an attorney in an advisory capacity regarding the interrogation of another expert who may be presenting testimony. This service must be performed in good faith and not maliciously. Its purpose is to prevent incompetent testimony but not to thwart justice.

Responses: Responses from members of the Association to these issues (or to other issues they may see which were not specifically raised), are requested to be included in the next newsletter. If you wish to remain anonymous, please so state. As stated above, the purpose of presenting this issue is to stimulate discussion. Therefore, please include an explanation of your reasoning for your response and send to:

V. Parker Bell
225 East Third Ave.
Escondido, CA 92025

# CAC MERCHANDISE

Show your colors (or colours) at home, at work, or at play. Be the first (and probably the only) person on your street to have one of these. Limited stocks are on hand at CAC Seminars and by mail (via John DeHaan (California DOJ/CCI, in Sacramento). Special order items and colors are available on request. All CAC clothing items bear a specially embroidered emblem. These goodies are offered to you at cost, so you won't find a better deal.

The current offerings are listed here. if you would like to see a particular product offered, contact John De-Haan (DOJ/CCI) or Sue Swarner (Contra Costa County).

**Ties** with a custom embroidered CAC logo, in navy or burgundy: $12.00

**Sweatshirts** in various colors (50/50 blend): $11.00, hooded $12.50

**Hats** (one size fits all, mesh and foam, various colors with white: $5.50

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**Golf Shirts** (Hanes Cotton/Polyester, short sleeve): $15.50 Available in: black burgundy, slate grey, eccru, navy, kelly green, red, yellow, light blue, siler and white

**Sweaters** (long-sleeve acrylic pullovers): $17.50

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Sweaters or Vests available in: black, brown, burgundy, tan (camel), light blue, red and navy. (100% Orlon available at extra cost)

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**Forensic Science Society Ties**: Embroidered FSS motif: $6.50 (navy brown, burgundy) Woven multiple scale/microscope motif: $.500 (burgundy)

**Plaques**: $20.00

**Pin Badges**: $3.00

**Publications:**

The following publications are available from the CAC. These are available at the CAC table at our semi-annual seminars. For further information, contact John DeHaan or Susan Swarner.

Explosion Investigation, Yallop $25.00

Science Against Crime, Kind/Overman $15.00

Eight Peak Index of Mass Spectra $65.00

Measurement of Breath Alcohol $13.00

Bibliography on Ethyl Alcohol, Holleyhead $25.00

The Scientific Investigation of Crime, Kind $55.00 (special CAC price)

The Controlled Substances Act: A Resource Manual of the Current Status of the Federal Drug Laws, Alexander Shulgin $25.00

CAC Policy Manual, complete with By-Laws, Officer Duty Statements, CAC Policy Statements, Ethics Enforcement Procdure with Binder: $20.00

Index to CAC Seminars - free to members, $10.00 to non-members.

CAC Abstracts (with index, in a three ring binder with the CAC logo) - $25.00 for members, $50.00 for non-members

Three Ring Binders: Blue & Grey with CAC Logo: $10.00

## Notice to Contributors

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

This newsletter publishes material of interest to its readers and is pleased to receive manuscripts from potential authors. Meeting announcements, employment opportunities, course announcements, etc. are also solicited.

Advertisements are also accepted, although a fee is charged for their inclusion in the Newsletter. The acceptance of any advertisement is at the sole discretion of the Editorial Secretary.

This Newsletter is prepared using Ventura Publisher™ Ver. 2.0, running on an IBM AT-type microcomputer and printed on an HP Laserjet™ II printer. Because of its mode of preparation, the Editorial Secretary requests that, if possible, all submissions to the Newsletter be made in the form of files contained on 5.25 inch IBM formatted diskettes (Either 360KB or 1.2MB). The following word processing programs can be accommodated: Wordperfect 4.2 and 5.0, Wordstar 3.0, 4.0 and 5.0, Microsoft Word, XyWrite, Writer, and Multimate. Because of its widespread availability, Wordperfect 5.0 is preferred. Output from wordprocessing programs not listed above should be submitted in ASCII format. If possible, the submitted files should contain as few enhancements (bold, italic, centering, multiple typefaces) as possible. Drawing and images can also be directly imported, contact the Editorial Secretary for details and acceptable file formats.

The deadlines for submissions to the newsletter are December 15, March 15, June 15, and September 15.