Northwest Association of Forensic Scientists

NEWSLETTER

PRESIDENT'S MESSAGE

Time, tide, and the Newsletter wait for no man (or woman). Past President - from WAY past - Beth Carpenter warned me the President's message was always a last minute effort to make sense. She also warned me that I never make sense so I'm doomed from the start. Now that I've rambled through those tough opening sentences I can get to the meat (or meet) of this message.

Let's all meet in Portland for this fall gathering. Ken and Arnie have been working hard on the program and it should be worthwhile. And if I know Brad Telyea the arrangements for all the rooms, food, hospitality room, etc. will also come off flawlessly.

Rumor has it that Arnie has scheduled himself a one hour block of time to re-tell his famous jokes from previous years. As an unofficial member might say, "BAAA!" No pun intended Arnie - say I sheepishly ...

Let me also put in a personal plug here for meetings. The Vancouver RCMP people - Jeff Caughlin, in particular - have volunteered to host the fall of 1994 meeting. This would be a joint venture with the Canadian Society as Jeff is President of that group. I bring this up now because many of you will not personally get to Bend for the Spring 1993 meeting where we will vote on a location. Perhaps you can make your feelings known. Write me - or Ken McDermott - a note stating your preference. I have always found Vancouver, BC a great place and I think it's great if we can bolster our ties with the Canadians. There may be others out there who want to go somewhere else, but since I have the inside track o the information, I get to speak first. However, its still up to the voting members to choose where we go, so let your wishes be known.

Subject change - one thing I haven't figured out about the President's message. Is the President supposed to write something that reflects the Association's feelings or does (s)he just get to spout off? Kind of a second editorial opinion. But it is too late to gag me since this is my last message. With that in mind, I will voice another PERSONAL opinion.

I was somewhat disturbed by one of the presentations given at the Reno meeting. For those who weren't there let me try to give a brief recount.

A paper was given regarding a shooting and a crime scene reconstruction. This talk went on about the evidence seized, statements given, and, finally, testimony by experts - both state (that's the Crown for Larry Campbell) and defense. This particular presenter then went on to explain how one expert had altered evidence in the hallway of the courthouse to match their testimony. Pretty serious charge, if true. Now I believe that kind of accusation deserves a hearing on both sides. This is not something to be thrown out as part of a "professional" paper. Let's remember what our professional meetings are for and there is a separate route for ethical charges. Everyone deserves a chance in THAT arena and not to be blind-sided by comments in a presentation. Unfortunately, I fear the question of ethical behavior may become more prominent and something this Association is going to face more often in the future. WHEW - that's about as long as I can be serious in print.

Now to lighter items - though not less serious. Please give me ideas for the spring 1993 meeting. I can now steal anything Kelso - Portland didn't use. We are ready (tomorrow) to bury our skeletons so there will be a buried body class. Ken has promised to give me his unused ideas but let me hear from you also. I'll take almost anything. If I don't get enough ideas then you may suffer the consequences of warped things I may think of myself ... and I intend to ask Pam Marcum and Maria Fassett for their further crazy ideas - BE WARNED! Bend is a very liberal town.

Until Portland - when you can lynch me - everyone please be safe. We have to stay ahead of the "bad" guys.

Mike Howard

JOB ANNOUNCEMENTS

ATF Seeks Arson Section Chief

The Bureau of Alcohol, Tobacco and Firearms Forensic Science Laboratory in Rockville, MD is seeking applicants for the position of Arson Section Chief. Candidates must have a minimum of a bachelor's degree in chemistry or other physical/ life science (with at least 30 semester hours of chemistry). The incumbent serves as a first level supervisor, providing both administrative and technical leadership to Section members, in addition to performing complex case examinations. Extensive experience in fire debris and/or explosives analysis is preferred. Salary: $46,000 - $70,000 based on experience.

Contact: Donna Hamilton
Employment Branch, Room 4170
BATF
650 Massachusetts Avenue, N.W.
Washington, DC 20226
(202) 927-8610
For complete application information. Please refer to Vacancy Announcement #92-391 HB/cs

Contact: Rick Tontarski
BATF
1401 Research Blvd.
Rockville, MD 20850
(301) 443-5337
for questions concerning the position.

ATF Seeks Arson Section Chemist

The Bureau of Alcohol, Tobacco and Firearms Forensic Science Laboratory in Rockville, MD is seeking applicants for the position of Arson Section Chemist. Candidates must have a minimum of a bachelor's degree in chemistry or other physical/ life science (with at least 30 semester hours of chemistry). The incumbent serves as a specialist in fire debris analysis and other trace evidence, including explosives. Salary: $26,700 - $50,500 based on experience.

Contact: Donna Hamilton
Employment Branch, Room 4170
BATF
650 Massachusetts Avenue, N.W.
Washington, DC 20226
(202) 927-8610
For complete application information. Please refer to Vacancy Announcement #92-267 HB/cs

Contact: Mary Lou Fultz or Rick Strobel
BATF
1401 Research Blvd.
Rockville, MD 20850
(301) 443-5337
for questions concerning the position.

NWAFS Officers - 1992

Excecutive Committee

President	Mike Howard, OSP Forensic Lab - Bend, OR
President-Elect	Ken McDermott, WSP Crime Lab - Kelso, WA
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Historical	Brad Telyea, OSP Forensic Lab - Portland, OR
Membership	John Bowden, CA Criminalistic Institute - Sacramento, CA
Technical Advancement	Robert Thompson, Genelex Corp. - Seattle, WA
Editorial	Roger Ely, DEA Western Lab - San Francisco, CA

BROWARD SO SEEKS DNA SPECIALIST

The Broward County Sheriff's Office Crime Laboratory is seeking applicants for a DNA Specialist. Minimum qualifications include a Bachelor's Degree in biology or chemistry plus three years of forensic serology. Additional education or DNA training may be substituted for work experience. Duties include analysis of biological materials in a full range of case work applications including handling of radioactive materials (P32). Candidates must be able to render expert witness testimony and are subject to polygraph, drug testing, medical testing, and background examination. Salary range: $35,768 - 50,343 plus benefits.

Contact: Broward County Sheriff's Office
Personnel Division
2600 Southwest 4th Avenue
Fort Lauderdale, FL 33315

FORENSIC SCIENCE CERTIFICATION OFFERED

The American Board of Criminalistics (ABC) is pleased to announce the initial offering of the General Forensic Knowledge Examination leading to Certification and Diplomat status. The inaugural examination will be held at the American Academy of Forensic Sciences Meeting in Boston, MA, February, 1993. Additional offerings will be announced at a later date. Specialty area exams, which lead to ABC fellow status, will be available beginning in 1994.

WHAT IS THE AMERICAN BOARD OF CRIMINALISTICS?

The ABC is composed of the regional and national organizations below:

CAC	California Association of Criminalists
MAAFS	Mid-Atlantic Association of Forensic Scientists
MAFS	Midwestern Association of Forensic Scientists
NEAFS	Northeastern Association of Forensic Scientists
SAFS	Southern Association of Forensic Scientists
AAFS	American Academy of Forensic Sciences Criminalistics Section

The ABC Board is comprised of representatives from these associations. Your regional representative can answer any questions that you may have regarding the certification process.

WHAT IS CERTIFICATION?

Certification is a voluntary process of peer review by which a practitioner is recognized as having attained the professional qualifications necessary to practice in one or more disciplines of criminalistics. The ABC will offer a certificate in criminalistics, as well as in the specialty disciplines of forensic biology, drug chemistry, fire debris analysis, various areas of trace evidence examination, and others.

ABOUT THE NEWSLETTER ...

The Newsletter is the official publication of the Northwest Association of Forensic Scientists. It is published 4 times a year in the months of March, June, September, and December. The Newsletter welcomes submissions from its membership such as technical tips, case studies, literature compilations, workshop or training notices, reference citations, commentary, historical accounts, and other topics of interest to the membership. While not required, it is requested written material submitted for publication to the Newsletter be word processed using WordPerfect 4.2 or greater, WordStar, Microsoft Word, Microsoft Word for Windows, or AmiPro on either 5.25 or 3.5 inch floppy disks. Deadline for submission is the 15th of the month before publication, however, exceptions can be made. For more information regarding the Newsletter, contact:

Roger A. Ely, Editor
DEA Western Laboratory
390 Main Street Room 700
San Francisco, CA 94105
(415) 744-7051 - voice

CANDIDATE QUALIFICATION REQUIREMENTS

General qualifications.

a. Applicant must agree to abide by the ABC Rules of Professional Conduct.
b. Applicant must submit two references who can attest to the applicant's qualifications.
c. Each applicant's qualifications will be reviewed and must be approved by the ABC Credentials Committee.

Educational qualifications.

Applicants must possess an earned baccalaureate degree in a natural science or an appropriately related field.

Professional experience qualifications.

Applicants must have a minimum of two years experience in a forensic science and be employed in a professional capacity engaged in the examination of physical evidence, interpretation of data, and/or technical consultation for litigation purposes.

Certification(s) awarded.

a. Diplomat certificates will be awarded to those who successfully complete the general forensic knowledge examination.
b. Fellow certificates will be awarded to those who successfully complete the general forensic knowledge examination and at least one specialty examination, and meet proficiency testing standards. The fellow certificate will list the area(s) of specialization.

Examinations.

a. For Diplomat and Fellow - In addition to meeting the requirements above, applicants must pass a comprehensive written General Forensic Knowledge Exam, which includes the following:
   Basic philosophical and scientific concepts;
   Basic questions on techniques;
   Ethics;
   applicable areas of Civil and Criminal Law.

b. For Fellow Only - Successful completion of specialty examinations(s) and periodic proficiency examines in the specialty area(s).

REQUEST FOR INFORMATION

Certification is but one of the avenues for improving the professional status of those conducting analyses in criminalistics. To become a part of this program, please mail or FAX (516-261-2120) your name, agency address and telephone number to:

American Board of Criminalistics
Certification Information & Applications
P.O. Box 209
Greenlawn, NY 11740

PLANS FINALIZED FOR FALL 1992 MEETING

Clear your subpoenas and make your hotel reservations at the Columbia River Red Lion Hotel in Portland for the last week of October.

The Fall meeting is coming together very well with three workshops, two roundtable discussions, and a very full schedule of technical papers and presentations.

The workshops on Tuesday and Wednesday, October 27 and 28, are a crime scene photography workshop and two trace evidence workshops (forensic paint analysis and microtoming). Also on Wednesday we have two roundtable discussions planned on trace evidence and toxicology, along with a wildlife serology symposium. Late in the afternoon, there will be a presentation of the forensic details of a major homicide case which occurred in Oregon in January 1989.

The technical session will be held all day Thursday and Friday morning. It is filled with a wide range of presentations including trace evidence, DNA, photomicrography, digital imaging, use of computers in forensics, and a "pleasure" house investigation.

By now you have received your registration package. Be sure to mark your calendar accordingly. See you in Portland!!

SOBERING DRUG

POPULAR SCIENCE MAGAZINE
MARCH 1992 PP. 23-24

Forget the old strategy of sobering up with strong, hot coffee. David Whitmire, a chemical engineer and assistant professor at the University of Georgia, has developed an experimental drug that appears to reverse the effects of alcohol consumption. By combining three natural enzymes in the laboratory, Whitmire created a drug that metabolizes alcohol into acetic acid. In the stomach, the drug breaks down alcohol before it can be absorbed into the bloodstream.

The drug also works in the small intestine. Because the small intestine and the bloodstream have a huge surface area in common, the body maintains equal concentrations of alcohol in those two areas. When the drug metabolizes intestinal alcohol into acetic acid, it creates an imbalance. In response, the body actually draws alcohol out of the blood and back into the intestine, where the drug again metabolizes it, reestablishing the imbalance. Whitmire calls the drug "a black hole for alcohol."

If the drug proves successful in clinical tests, it could have several important applications. Emergency-room personnel could use it to lower dangerously high alcohol levels in the body. Casual drinkers could use it to sober up before leaving a bar or party. Whitmire hopes that it will keep people from driving under the influence. "That's the most potent, important use." He is working on the product under a five-year grant from the federal Alcohol, Drug Abuse, and Mental Health Administration.

(Courtesy of the Canadian Society of Forensic Science Society, Volume 25, Number 2, June 1992)

REFERENCE ABSTRACTS

The following literature citations and abstracts are printed for the benefit of the Association membership to keep informed about their practice. The Newsletter welcomes additional literature references from non-mainstream forensic sources that will broaden the knowledge base of the Association.

"Reactions of Police Officers to Body-Handling After a Major Disaster. A Before and After Comparison"

D.A. Alexander and A. Wells, *British Journal of Psychiatry*, Volume 159, 1991, pp. 547-555.

This study reports the results of an unusual opportunity to follow up a group of police officers who were involved in body-handling duties following the Piper Alpha disaster, and for whom there were available data from pre-disaster assessments. In addition, after these duties, the officers were compared with a matched control group of officers who had not been involved in such work. The comparisons failed to demonstrate high levels of post-traumatic distress or psychiatric morbidity. The results are interpreted in terms of issues such as the officers' own coping strategies, and major organization and managerial factors.

"Comments on DNA-Based Forensic Analysis"

C.T. Caskey, *American Journal of Human Genetics*, Volume 49, 1991, pp. 893-894.

The author responds to an earlier editorial regarding the use of DNA technologies for human identification in forensic matters. The author proposes four major issues surrounding the question: 1) the scientific principles backing the DNA methods, 2) the criteria which determine match, mismatch, and inconclusive data with regard to RFLPs of forensic sample and suspect, 3) the "significance of the RFLP(s) match," and 4) quality control and assurance of data. The author finds the use of such technology reasonable as long as highest-quality data and laboratory quality assurance are followed.

"Analysis of Dyes Extracted from Textile Fibers by Thermospray High-Performance Liquid Chromatography Mass Spectrometry"

J. Yinon and J. Saar, *Journal of Chromatography*, Volume 586, 1991, pp. 73-84.

Thermospray high-performance liquid chromatography was used to analyze a series of disperse dyes extracted from polyester and cellulose acetate fibers, a basic dye from orlon fiber and a vat

dye from denim. Molecular characterization of each dye was obtained from the extract of a single fiber, 5-10 mm long. This was achieved by high-performance liquid chromatography followed by thermospray mass spectrometry of the separated dye.

"Using Forensic Techniques to Verify Self-Reports of Needle Sharing"

D.R. Gibson, J.R. Guydish, B.G.D. Wraxall, E.T. Blake, G. Clark, and P. Case, *AIDS*, Volume 5, Number 9, 1991, pp. 1149-1150.

IV drug users were recruited in a street setting and asked to provide syringes for the anonymous study. Users were questioned as to whether the syringe had been shared with anyone else. Forensic examination of blood residues in the syringes suggest self-reporting of needle sharing might be understated. Blood samples were examined using PGM, Gm, Km, and HLA-DQ alpha.

"Microscopic Characterization of Particle Size and Shape: An Inexpensive and Versatile Method"

M.E. Houghton and G.E. Amidon, *Pharmaceutical Research*, Volume 9, Number 7, 1992, pp. 856-859.

A variety of methods exist for measuring individual particle dimensions as a means of characterizing particle size, size distribution, and shape. The equipment described in this report belongs to the class of semiautomatic non-TV-interfaced analyzers. Unlike many existing image systems, three-dimensional form measurements and texture data for the calculation of particle size and shape parameters can be determined easily and directly from each particle profile using this system. Essentially all data are collected directly from the particle and recorded by the computer with no intermediate steps. Much of the system consists of general-purpose and relatively inexpensive, commercially available hardware and software. Using this method, particle size, size distribution, and qualitative or quantitative shape information can easily and rapidly be obtained simultaneously. Particle length and width characterization, for example, can take less than 15 minutes. The equipment is versatile and flexible in measurements and calculations. The size and shape parameters to be measured are determined by the researcher and not the instrument. The ease with which this information can be obtained from small samples early in the development process makes it a valuable tool for the formulator.

"The Conversion of Ephedrine to Methamphetamine and Methamphetamine-like Compounds During and Prior to Gas Chromatographic / Mass Spectrometric Analysis of CB and HFB Derivatives"

A.H.B. Wu, S.S. Wong, K.G. Johnson, A. Ballatore, and W.E. Seifert, Jr., *Biological Mass Spectrometry*, Volume 21, Number 6, 1992, pp. 278-284.

Ephedrine and methamphetamine standards were separately derivatized with heptafluorobutyric anhydride (HFBA) and carbethoxyhexafluorobutyryl chloride (CB) and analyzed by full-scan gas chromatography / ion trap mass spectrometry with electron ionization (EI) and chemical ionization (CI). Using EI, a high-concentration ephedrine standard produced a total ion gas chromatogram containing several minor HFB derivatives in addition to ephedrine. One of these had the same retention time as the derivative of methamphetamine, while another eluted 3 seconds later. Both contained the same major mass fragmentation ions that could be erroneously used in targeted selected ion monitoring gas chromatographic / mass spectrometric analysis for methamphetamine. The full-scan EI and CI spectra showed that these derivatives were not methamphetamine. CI mass spectrometric studies of ephedrine scanning up to *m/z* 700 demonstrated that reaction with HFBA caused acylation of both the hydroxyl and secondary amino groups. The HFBA used in this study was contaminated with pentafluoropropionic anhydride and trifluoroacetic anhydride and produced mixtures of derivatives, some with retention times near or identical to that of methamphetamine. In contrast, CB derivatization of ephedrine produces a single methamphetamine-like compound that has the same retention time and mass spectra as methamphetamine, and is produced only when high gas chromatographic injector temperatures are used (>260°C). Collision-induced decomposition tandem mass spectrometric studies for the CB derivative verified that methamphetamine is produced from ephedrine at elevated GC injection port temperatures. In view of these findings, substance abuse testing for methamphetamine in urine must proceed with caution when ephedrine and other sympathomimetic amines are present. Definitive analyses can be accomplished by full-scan CI gas chromatographic / mass spectrometric analysis with HFB derivatives, or by lowering gas chromatographic injector temperatures with CB derivatives.

"Ethanol / Cocaine Interaction: Cocaine and Cocaethylene Plasma Concentrations and Their Relationship to Subjective and Cardiovascular Effects"

M. Perez-Reyes and A.R. Jeffcoat, *Life Sciences*, Volume 51, 1992, pp. 553-563.

To investigate the pharmacologic effects of the interaction between ethanol and cocaine, eleven male, paid volunteers familiar with the use of both ethanol and cocaine were tested in a dose-response, placebo-controlled, single-blinded, randomly-assigned, cross-over design. Ethanol (0.85 g/kg) or placebo was administered in divided doses over a thirty minute period. Fifteen minutes after the termination of ethanol ingestion, cocaine HCl (1.25 and 1.9 mk/kg) or placebo (lidocaine and mannitol) was given be nasal insufflation (snorting). Cocaine and cocaethylene plasma concentrations, blood ethanol levels, subjective ratings of drug effects, and cardiovascular parameters were measured. Statistical analysis of the results indicate that: 1) cocaine administration did not alter blood alcohol concentrations nor the ratings of ethanol intoxication; 2) ethanol caused a significant increase in cocaine plasma concentrations, ratings of cocaine "high", and heart rate; 3) acute tolerance to the subjective and heart rate effects of cocaine was observed; 4) when combined with cocaine, ethanol led to the slow formation of cocaethylene in amounts much lower than those of its parent compound; and 5) The appearance of cocaethylene in plasma did not alter cocaine's subjective and cardiovascular effects.

ABSTRACTS OF PAPERS PRESENTED AT THE SPRING 1992 CALIFORNIA ASSOCIATION OF CRIMINALISTS SEMINAR

"The pH Pen - A Means Of Comparing Paper Products"

R. D. Blackledge*, N.I.S. Regional Forensic Laboratory, San Diego, CA

Mark N. Gernandt, N.I.S. Regional Forensic Laboratory, San Diego, CA

For the production of fine white paper many companies are switching from a process that uses titanium dioxide and produces a paper having a residual acidity (acid paper), to a process that uses calcium carbonate and produces a paper having a residual alkalinity (alkaline paper). Because of this change, printers need to use a pH pen to test the alkaline/acid content of paper stock to determine if it is compatible with a given formulation of printing ink. Questioned document examiners may find the pH pen useful as an additional test when attempting to determine if two paper products could have originated from a common source. The authors attempted to discriminate among sixty-eight different fine white paper products using a combination of physical characteristics, fluorescence under UV light, and the pH pen. From a total of 1278 possible pairs (Questioned and Known), physical characteristics alone could discriminate all but 55 pairs. All but 20 pairs were discriminated by physical characteristics plus fluorescence, and adding the pH pen reduced the number to just six groups of pairs.

"The New 3m Disposable IR Card For Qualitative Mid-Infrared Analysis"

James Gagnon*, 3M DPD New Products Group

Neale Povey, Jr., 3M MISD Lab

The new 3M Disposable IR card is described for use in mid-infrared spectra photometric analysis of liquids, semi solids, and soluble solids. The sample is applied to the unique sample application area and any volatiles are rapidly evaporated. Infrared spectra obtained contain minimal spectral interferences, thereby facilitating spectral manipulations such as ratios, base line corrections, library searching, etc. Infrared spectra obtained can be searched against standard condensed phase spectral libraries of samples prepared by using conventional sample accessories. Examples of commercially available products analyzed using the sample support system will be presented. Various techniques successfully employed in conjunction with the new sample holder will also be shown.

"The 3m FTIR Sample Window: Trial Results"

R. D. Blackledge, N.I.S. Regional Forensic Laboratory, San Diego, CA

Prototypes of a new FTIR sampling window developed by James E. Gagnon of 3M Company were made available to the author for testing in the fall of 1991. Properties of the sampling window were first compared with a similar, previously-reported IR sampling method involving stretched PTFE (Teflon®) tape. The sample windows were then tested with a variety of samples including several from current cases. Results which compared well with conventional IR sampling methods were obtained for samples which could either be dissolved or finely dispersed in a volatile solvent, deposited on the sample window, and then remained unchanged upon solvent evaporation. Less successful results were obtained with samples which were dissolved in a volatile solvent, deposited on a window and crystallized upon solvent evaporation. Although the sample windows are not likely to supplant KBr discs for routine drug cases, they have advantages for many trace evidence applications. An especially important advantage in forensic science is that they are not fragile, and once prepared may be labeled and retained for subsequent evaluation.

"Quantatative Variation In Molecular Weight Of Environmentally Abused Samples Subjected To RFLP Analysis"

Keith Inman, Department of Justice DNA Laboratory

Samples subjected to controlled environmental abuse conditions (laboratory-induced) and uncontrolled environmental abuse conditions (samples from "non-probative" cases) were examined for the amount of variation produced in the calculated molecular weights of DNA digested with HAE III and probed for various VNTR's (D2S44, D10S28, D17S79, D1S7, D4S139). Controlled abuse experiments included stressing known samples with controlled amounts of heat, humidity, UV, and sunlight, as well as different substrates, for limited periods of time. Uncontrolled abuse samples consisted of vaginal, oral, and rectal samples from rape kits compared to reference blood samples from the victim. Experience with the process resulted in modification of the protocol for casework to incorporate double Pro-K digestion, multiple organic extraction, Centricon dialysis and concentration, double restriction enzyme digestion, and electrophoresis on 20 cm agarose gels without ethidium bromide. The variation in calculated molecular weight size for the controlled-abuse samples, and between the evidence and reference blood samples was compared to the variation seen among control samples. This constitutes a portion of the information

used in the development of the "match" criteria for the laboratory.

"290.2 Storage And Preservation Experiment: Part A & B"

Mary Pierson *, Department of Justice, DNA Laboratory
Michele Horne *, Department of Justice, DNA Laboratory

The purpose of this experiment was to examine what effects, if any, storage of blood samples has on DNA analysis. The samples were collected in either ACD or EDTA tubes and stored refrigerated in liquid form or frozen as dried stains. The study was completed in two parts. Part A studied bloodstains stored over a period of time and Part B compared the various storage conditions for a single individual's blood drawn at a specific time point.

Part A:

Thirty-eight (38) bloodstains were selected from the 290.2 Program and divided into donor sets. A donor set is defined as a collection of three (3) or four (4) blood samples drawn over a period of time from one individual. The period of stain storage dated from August 1986 through March 1991. The blood samples from a donor set were spaced from 5 to 36 months apart. Obtaining stains from donor sets to represent each year of storage was not possible due to the randomness of the blood drawings. The stains were analyzed in duplicate for DNA profiling by RFLP and HLA DQ alhpa PCR methods. The results demonstrate that aged 290.2 Stains may be typed up to approximately five (5) years.

Part B:

Twelve (12) storage condition sets were selected from the 290.2 Program for analysis. Each set represents an individual and is defined as a liquid blood sample stored in EDTA, a liquid blood sample stored in ACD, and a stain made from the EDTA whole blood. The period of storage for the samples analyzed ranged from January 1990 through May 1991. The samples were analyzed in duplicate for DNA profiling using both RFLP and PCR methods. The results demonstrate that dried bloodstains are the best method of long term preservation for DNA analysis. The results also indicate that EDTA is a better preservative than ACD for liquid whole blood stored for long periods of time. Liquid blood samples stored longer than 1 year in ACD tubes yield no RFLP DNA typing results; however PCR DQ alpha results were obtained.

"California DOJ DNA Database Program Progress Report"

Lance Gima, Department of Justice DNA Laboratory

In 1983 SB 809 was enacted requiring convicted sex offenders to provide a blood and saliva sample prior to their release from prison. For several years conventional serology was conducted on these examples and the data became an important part of investigations across the state. In 1990 SB 1408 was passed by the legislature. This bill established the California DNA Database Program which became an extension of the program established in 1983. Although SB 1408 was passed in 1990, the database program was never funded. The current status of this program will be discussed along with the steps the California Department of Justice DNA Laboratory is taking to make this program as useful as possible in light of the budget problems. Issues such as sample verification, racial origin information, analysis prioritization and connection to the national database program will be discussed.

"Enhancement Of Faint And Dilute Bloodstains With Fluorescence Reagents"

Louis A. Maucieri *, California Criminalistics Institute, Sacramento
Jamie W. Monk, University of Strathclyde, Glasgow Scotland

This paper describes experiments with bloodstain detection reagents that fluoresce. The intended application was for field use on faint, obliterated, or otherwise latent bloodstains. We sprayed various test reagents on stains dried upon several surfaces (made by serial dilution). Many of these tests produced reactions resulting from the heme-peroxide catalyzed oxidation of the reagent. Resulting complexes fluoresced with the irradiation from the handheld ultraviolet (UV) lamp. The dye fluorescin exhibited good sensitivity and ease of application to visualize faint or dilute bloodstains.

"The Death Of Shirley Daniels: A Reconstructive Behavioral Examination"

Michael Prodan *, Special Agent, California Department of Justice
Gary V. Cortner *, Senior Criminalist, California Department of Justice

This paper discusses the death of a 19-year-old female which occurred in 1977. Although homicide was originally suspected, the case was ruled a suicide in 1985. This action caused considerable controversy, not only in the law enforcement community itself but with the victim's family as well as the press. In 1991 the case was reopened and the California Department of Justice was brought in. A Criminal Investigative Profiler, Criminalists, and Latent Print Analysts all consulted in the results. This paper will discuss their findings.

"Forensic Anthropology And Its Applications: Illustrations From The Warren Chase Case"

Roger Marks La Jeunesse, PhD., Professor of Anthropology, California State University, Fresno

This presentation will illustrate anthropological problems encountered in a homicide case, including the morphological analysis of hand and footprint data. Although the focus of the discussion will be the Chase case, supplementary examples will be drawn upon from other cases that the author has worked on to illustrate the applications of anthropological knowledge in the resolution of homicide investigations.

"Designing And Building A PCR-Based DNA Laboratory"

Theresa Spear, Santa Clara County Laboratory

Properly designing a laboratory requires a thorough understanding of the work that will be performed. The design must facilitate the proper execution of the analytical steps and maximize efficiency by taking into account work flow. This paper will describe the process the Santa Clara County Crime Laboratory went through to design a PCR-based DNA laboratory, remodel existing space, select and purchase equipment, install laboratory benches and equipment, and implement DNA extraction, amplification and typing procedures.

"Comparative Stability Of The Acidic (+) And Basic (-) Alleles Of Phosphoglucomutase In Heterozygous Semen Samples"

J.M. White *, Orange County Sheriff-Coroner
M. M. Hong, Orange County Sheriff-Coroner

Ten semen samples which were heterozygous PGM types and contained one acidic (+) and one basic (-) allele were selected from semen samples collected from patients at a fertility clinic. The samples were aliquoted and stored either liquid or dried on cotton cloth at 37 degrees C, room temperature, refrigerated and in a -20 degree C frezeer. Samples were removed from storage periodically and relative activity of the two PGM isozymes were judged following agarose gel electrophorisis at ph 5.5. Samples removed from storage and not immediately analyzed were stored at -70 degrees C until analyzed. In some cases the samples remained typable until the storage collection for that sample was used up, while others eventually lost all activity. In broad terms, the 37 degree liquids were typeable for several days, the stains for several weeks; the room temperature liquids for a week and the stains for 2 to 3 months; refrigerated liquids for 2 months and the stains past 5 months. Testing of the freezer samples is ongoing. At present, after 6 months, the liquid samples are retaining typeable activity. In most samples the activity of the two isozymes deteriorated at a relatively constant rate. In some samples, differential enyzme activity loss was noted. Most frequently the acidic (+) activity exceeded the basic (-) activity, however one semen in the study had the (-) activity exceed the (+) in some samples. In no cases examined to date was there total loss of the weaker isozyme, but several samples required prolonged staining time to detect this band. This study provides further evidence for the cautious interpretation of weak enzyme banding patterns.

"Identification Of Oxazolidines As A New Class Of Impurities Found In Methamphetamine"

Mark F. Kalchik, California Department of Justice, Fresno Regional Lab

Over the past year a new class of compounds have been found in ephedrine and methamphetamine samples. These compounds belong to a class of compounds called oxazolidines. Oxazolidines are reaction products of ephedrine and usually an aldehyde or a ketone. The basic structure is 3,4-dimethyl-5-phenyl-1,3-oxazolidine. Variation is at the 2 position and is dependent on the starting aldehyde or ketone. They may appear as only trace components to significant compounds.

"When Is A Drug Standard A Standard"

Mark F. Kalchik, California Department of Justice, Fresno Regional Lab

All laboratories use standards which are purchased from chemical supply companies. We trust them to provide properly labeled compounds. However before using any standards care should be taken to confirm the identity of the compound before using. Care must be taken to either find known physical data or to be able to predict properties that can be measured. The properties to be checked should be appropriate to the use of the standard. On rare occasions an incorrectly labeled standards will be supplied. These have to be found and eliminated. Examples will be reviewed.

"Considerations In The Selection And Preparation Of A Drug Analysis Proficiency Test Sample"

John P. Bowden, California Criminalistics Institute, Sacramento

The California Department of Justice has cooperated with Collaborative Testing Service (CTS) by preparing a Drug Analysis Proficiency Sample for each of the past four years. The author formulated these proficiency samples. The most recent sample, number 91-5, was distributed to 238 participating laboratories. This sample consisted of several pieces of printed "blotter paper" which were impregnated with either Lysergic Acid Diethylamide (LSD) or Lysergol. The selection process, preliminary testing, and logistics of preparation and packaging of more than 250 duplicate test samples will be discussed. The results received from the 157 laboratories responding to the test sample will be summarized.

"Bootstrap Confidence Intervals For FBI Fixed Bin Genotype Probability Point Estimates With Modelling Of Both Sampling And Measurement Variance"

J. M. Hartmann, Orange County Sheriff-Coroner
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A computer program has been developed, which enables modelling of three sources of variance in estimating genotype probabilities using FBI-type fixed bin allele frequency estimates. These three sources of variance are: sampling, and both database sample and case sample band size measurements. Individual band size may be perturbed by a precision based independent normally distributed random factor. Genotype probabilities are calculated assuming independence within and across loci. Allowing for sampling variance alone, the four locus genotype probability 95% confidence intervals relative to the point estimates are approximately one order of magnitude out of nine. Database measurement variance has no effect on confidence intervals. Measurement variance of the case sample being

compared to the database has a minor effect on the confidence intervals.

"Critical Issues In Application Of The Empirical Scientific Method In Dna Profiling"

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There has been a legacy of neglect in applying the fundamental canons and critical concepts of the empirical scientific method in the area of measurement in the forensic field and their usage in establishing the sought-after actuality of uniqueness (individuality) of entities. This paper will address some of the critical issues involved in the application of the empirical scientific method in forensic problem solving endeavor. This discussion will be exemplified by a critical examination of the work being done in DNA-profiling endeavor in the criminal investigation arena. A number of violations of the empirical scientific method protocol which render this work scientifically unacceptable will be discussed. For example, not attempting to falsify basic theoretical concepts, not carrying out independent verification of observed phenomena, accepting unverified theoretical concepts as empirical facts, making scientifically unwarranted conclusions, etc.

"Phenotyping Of Gc Using A Double Antibody Technique"

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Group Specific Component (Gc), also known as Vitamin D Binding Protein, is found in various body fluids; including serum, urine, vaginal secretions and semen. Utilization of isoelectric focusing as a method for separating Gc into its phenotypes results in high discriminating power of 0.74. Because of this, Gc is useful in forensics. Phenotyping of Gc in secretions from vaginal fluids and semen is virtually impossible using a single antibody detection system. A double antibody technique, which uses an enzyme labelled second antibody, satisfies the need for detecting semen and minute bloodstains. {Gc is analogous to PGM in that it is found in the seminal plasma and can therefore be detected in vasectomized individuals}. The method employed utilizes isoelectric focusing as a means of separating Gc into its phenotypes. Following separation, the Gc proteins are passively transfered onto a Nitrocellulose (NC) membrane for detection purposes. Nonspecific binding sites on the NC are then blocked overnight using PBS (Phosphate Buffered Saline) solution. After blocking, the NC is removed from the blocking solution and put in a PBS buffer containing the first of two antibodies (anti-Gc IgG antiserum). This antibody binds with the Gc Proteins on the membrane, providing a "link" for the second antibody. After washing off excess antibody, the membrane is placed in PBS containing the second antibody, which is labelled with alkaline phoshatase. This enzyme-labelled antibody attaches to the first antibody. To visualize the Gc proteins, the NC membrane is submerged in a substrate buffer for the enzyme to act on. Consequently, the Gc alleles appear as blue bands on a white NC membrane. This method can detect blood stains up to at least a 1:300 dilution. Because of its sensitivity, it is possible to detect both male and female phenotypes from postcoital swabs. Whether the sample is a semen stain from a sexual assault case or a minute blood stain from a homicide, the method looks promising for casework.

"Slow Motion Blood Drop Studies"

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Blood drops on various surfaces at various heights and angles, from different objects. The studies that criminalists do to prepare them for bloodstain interpretation show surprising phenomena when a high speed video camera recorded the event. The camera is Kodak's, capable of 30 to 6000 fps. Most of the experiments were recorded at 1000 fps. which is enough to see bullets in flight.

"Resolution Of Excessive Homozygosity At The Locus D2S44 In A VNTR Database"

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A southern California database of Red Cross blood donors was obtained and analyzed for RFLP distribution using the restriction enzyme HaeIII and a D2S44 probe (YNH24), which recognizes both the consenus repeat unit and a flanking region. Twenty-three African-American single-banded patterns (sbp) were reanalyzed to detect closely spaced pairs (coalasced) and bands too small to be detected originally (nulls). When HaeIII and HinfI restricted DNA was separated in 1.5% agarose, seven of the sbp were found to be due to a previously unobserved ' null ' band. Two of the sbp had been the result of coalescence, as shown through prolonged electrophoresis in 2% agarose. All samples were restricted with PstI, which revealed a PstI restriction site polymorphism among null-allelic samples as well as four of the remaining unresolved sbp. The existence of a ' PstI heterozygote ' in a ' HaeIII homozygote ' shows that even if the HaeIII-cut VNTR alleles are the same length, the two VNTR alleles are not necessarily of common descent. In such a situation, it is important to distinguish between independence testing for genotype frequency determinations and detection of subpopulations.

"A Comparison Of Ethnic And Racial Databases And The Impact Of Population Substructuring On Multilocus Genotype Probability Estimates"

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HaeIII VNTR were used to characterize four Asian ethnic and three other racial databases. Comparison of band size distributions with the Smirnov two-sample test and of FBI fixed-bin allele frequencies with a log-likelihood test were made using a Monte Carlo technique to account for measurement as well as sampling variance. The ethnic groups displayed greater

homogenecity than was observed among the racial groups. Measurement variance had only a very slight effect on test results. Using 1990 U. S. Census figures for Southern California, the same ethnic databases were used to obtain Asian FBI fixed-bin average allele frequency sets, which ignore ethnic substructuring. Four-locus genotype frequencies were determined using these sets as well as with the original ethnic allele frequencies and population-weighted (stratified) genotype frequencies derived from them. The same type of analyses were performed at the total population level with Asian, Black. Hispanic, and White databases. The relative difference of the four-locus genotype probability estimates determined by the three methods rarely exceeded one order of magnitude out of ten, which is of no practical significance. Although some of the ethnic and most of the racial databases differed significanly in a statistical sense, such differences have only a minimal impact on the greater majority of multilocus probability estimates; and are of negligible significance in a decision making sense.

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