Northwest Association of Forensic Scientists

NEWSLETTER

PRESIDENT'S MESSAGE

The Fall meeting in Portland is over. What an experience! I have been told it was a success. As a program co-chairman, I was concerned that everything would fit together properly. There were a few glitches with room locations and refreshments. But, all in all, those problems were minor compared to all that was happening. The other program co-chairmen, Brad Telyea and Arnold Melnikoff, should feel a sense of satisfaction over the outcome of the meeting and I thank them for all their help. But the individuals who should really take pride in the success of the meeting are those who came forward to conduct the workshops and symposia. The work done by Peter Dratch with the wildlife symposium and Rick Carter with the toxicology roundtable discussion was unsolicited. They presented the idea, then made it happen. The two day photo workshop by Roger Ely was solicited. He was asked to put on the workshop and he made it happen with a day and a half of instruction and an evening session. These are only a few examples of the cooperation exhibited for the meeting. All of the presenters also made the meeting a success. Only one paper was scratched due to conflicts. I've heard it said that before many meetings the program chairman is on the telephone soliciting rigorously for presenters to fill time slots. It didn't happen in Portland! And for that, I thank all individuals involved.

I feel the real success, however, for this meeting was the attendance. And it was not only the usual attendees who made it successful. With a total of about 75 in attendance, approximately one -third were non -members. I think this is great in that we have a lot of people interested in this organization. Hopefully the non- members will submit applications and become members. The Fall and Spring meetings are the main vehicle by which the NWAFS membership will grow. Also, I believe, it is the obligation of the members to promote the NWAFS to non -members working in a variety of forensic disciplines during day to day contacts. If this is done, our organization will continue to thrive and everybody will benefit.

For those of you who weren't at Portland, your attendance at the upcoming meeting in Bend (April 1993) and Boise (September 1993) will make those meetings a success.

Ken McDermott

AS I SEE IT

Roger A. Ely
Editor

Fall Meeting in Portland

Congratulations to Brad Telyea, the OSP Forensic Lab - Portland, Kenny "Tequila" McDermott, and the staff of the WSP Crime Lab - Kelso for putting on a well-rounded meeting in Portland. The feedback I received about the meeting was nothing but accolades for the diverse workshop offerings, the wildlife forensics roundtable, the toxicology roundtable and the technical paper presentations. It was hard, at times, to concentrate on some of the presentations while being able to look out the meeting room window at the Columbia River flowing by.

Those of you who have volunteered in the past (and in the future) to host a meeting realize how much work putting on such an event - successfully, no less - can be. Just when you think you have all the bases covered and all the solutions to possible problems, something you didn't expect comes up to make you sweat. Leadership under extreme pressure would be a good description.

Fortunately, we were blessed with great weather for the first part of the week. This definitely made my photography workshop students happy since they would not have to do their class night photography shoot holding an umbrella over their equipment. The typical Northwest rain didn't set in until Wednesday night, which was OK since the rest of the meeting was going to be on our backsides listening to papers.

Another productive year in the membership department, too. Seventeen new members were added to the Association, bringing the total membership to about 261 strong. As I've mentioned several times, when I took over the Editor's job in 1986, there were about 165 members in the Association. In about 6 years, the membership has increased by 58%. Pretty amazing growth! Look around your laboratory and see how many of your staff are members of the Association. If you find some that aren't, have them contact Membership Chairman John Bowden at (916) 739-4380 for information about membership. The dues are cheap and the benefits are many!

Don't Pick That Scab!

"Don't pick at that scab or you will never heal!"

How many times did you hear this line from your mother when you were a kid? I remember is well because I lived in the fertile (and at one time wet) Central Valley of California where the summer irrigation by farmers was guaranteed to bring a mass of mosquitoes out looking for fresh blood. Being a kid that liked to be outside, I was an easy target for those bloodsuckers.

Well, the Association is not without its own oozing sore with a scab that isn't allowed to heal - the division of opinion over the issue of criminalistics certification and the ABC. This topic is often the topic of heated discussion whenever the Association meets. And like that young child, some people continue to prevent this wound from healing by their constant picking at the scab.

NWAFS Officers - 1992

Excecutive Committee

President	Ken McDermott, WSP Crime Lab - Kelso, WA
President-Elect	Don Wyckoff, ID Bureau of Forensic Services - Pocatello, ID
Secretary-Treasurer	Lionel Tucker, Jr., DEA Western Lab - San Francisco, CA
Member-at-Large	Larry Campbell, Regional Coroner - Vancouver, BC
Past President	Mike Howard, OSP Forensic Lab - Bend, OR

Committee Chairmen

Continuing Education	Arnold Melnikoff, WSP Crime Lab - Kelso, WA
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

The latest incident was met with general disgust from the membership attending the business meeting in Portland. During the meeting registration, a copy of a proposed resolution regarding certification and the Association's position on it was passed out. The resolution read:

"Resolution #1

Fall 1992

WHEREAS, the American Board of Criminalistics has been in operation for several years, and is providing a vital companion service to the criminalistics profession of the United States in the area of quality assurance by the institution of its criminalistics certification program;

and

WHEREAS, the members of the Northwest Association of Forensic Scientists are being denied full representation and voting privilege on this so vital advancement in forensic science;

and

WHEREAS, the Northwest Association of Forensic Scientists is not a member of the American Board of Criminalistics and is nationally conspicuous by its minority position of non-support of the American Board of Criminalistics;

and

WHEREAS, many of the members of the Northwest Association of Forensic Scientists acknowledge certification of criminalists and individually support the American Board of Criminalistics in its efforts to present such a program of certification of criminalists.

NOW, THEREFORE, BE IT RESOLVED, That the Northwest Association of Forensic Scientists: 1) acknowledge and support the purposes of the American Board of Criminalistics; 2) request membership in the American Board of Criminalistics, and upon receiving membership in the American Board of Criminalistics, select a member to be its representative of record and who shall exercise the Northwest Association of Forensic Scientists voting rights and represent the Northwest Association of Forensic Scientists at meetings as a membership director."

Whew! Pretty heavy stuff without much evidential support. This raised some real hackles on the attending membership and, once again, set a confrontive stage for the discussion of the resolution.

Some of the comments expressed during the discussion included:

1. It was pretty brazen for the author of this resolution to present this to the membership in attendance at the business meeting without any prior notification. Further, it was rude for the author not to be present to answer questions and defend the resolution, but rather have staff members be the bearers of the controversial proposal. It certainly didn't set well with some of the staff members.

2. The resolution was an insult to the membership of the Association. It has been well stated in previous meetings, and is the position of the Executive Board, that the issue of certification effects the total membership. Its fate will be decided by the total membership, not just those in attendance at a single meeting.

3. The resolution was premature and inappropriate. The total membership voted to nominate Dale Mann to a Member-at-Large position on the ABC in a fact finding-gathering role for the duration of his 3 year term. At the completion of the term, the total membership will be polled and a decision made. The end of the term is not until December 1993 and, thus, the Association remains in a fact-gathering mode.

4. There was no evidence to support the claims of the resolution.

Larry Campbell, Regional Coroner in Burnaby, BC best expressed the sentiments felt by many saying, "I consider the members of this Association to be my friends, and I view the Association, as a whole, as a group of friends with a common interest. This [the introduction of the resolution] is not what friends do to friends."

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

As I've said in the past, the ABC supporters in our Association often do themselves the most harm by being what might be viewed as underhanded in their promotion of the ABC. When the ABC was first introduced to the Association back in 1988-89, it was sprung on the membership without forewarning and received largely negative support because of the lack of information to make an educated choice.

Since then, the Association has invested a large amount of money and time into the gathering of details about the ongoing certification process, reporting the information in each Newsletter and at each meeting. Despite this organized effort to inform the membership, the presentation of the resolution damaged much of the credibility the ABC may have gained in the past two years.

Now, leave that scab alone!!

Committee Members Needed

The Association has several standing committees that operate to fulfill the needs of the membership. Often, it seems like the only people involved with the day to day operation of the Association are the Executive officers. Yet, the Association has 5 standing committees working to provide services to the membership. If you are interested in becoming active in one of these committees, contact the committee chairman for more information. The Association can always use input and new ideas to better server the membership.

Continuing Education: This committee is chaired by Arnold Melnikoff. Arnold recently transferred to the WSP-Spokane laboratory and can be reached at (509) 456-4141. The Continuing Education committed collects and catalogs reference materials for the Association library. The library contains numerous training courses on audio and video tape, reference texts, reference slides, video tapes of presentations made at meetings, and other materials to possibly better yourself professionally. Each March, a listing of the holdings of the Association's library are printed. These materials are also loaned out to other regional forensic associations on request.

Historical: The Historical committee is chaired by Brad Telyea of the OSP Forensic Lab, Portland. This committee is charged with collecting and storing materials generated from Association meetings and functions to serve as a historical record of the Association. This includes photographs taken at Association meetings, workshops, and banquets, and other printed documentation. This year the Association celebrated its 20th Anniversary during the Spring 1992 meeting in Reno. At the banquet, numerous displays of early Association activities were set up for the membership to peruse and reminisce about. Activity in this committee could include walking around the next meeting with a camera recording the activities of workshops, registrations, etc. For more information, contact Brad at (503) 229-5017.

Membership: The Membership Committee is chaired by John Bowden, CA Department of Justice in Sacramento. This committee responds to requests for membership applications and actively recruits new members in our service region. Committee members also review pending membership applications and nominates the new slate of officers for the Association each year. The Membership Committee also records the attendance of the membership and determines if the "1 in 6" meeting rule is being adhered to. If you are interested in the work of this committee, contact John at (916) 739-4380.

Technical Advancement: The Technical Advancement Committee, better known as the Proficiency Testing Committee, is chaired by Robert Thompson of Genelex, Inc. of Seattle. This committee provides quality assurance testing samples to participating Association agencies to gauge proficiency in the many areas of criminalistics including drug analysis, firearms examinations, serology, hair and fiber examination, foot wear examinations, and toxicology. The committee seeks members to prepare test samples for mailing to participating laboratories. It is the goal of the committee to provide at least one test a year in each working area of the crime lab. If you would like more information regarding this committee, contact Robert at (206) 382-9591.

Editorial: The Editorial Committee is chaired by Roger Ely of the DEA Western Lab, San Francisco. This committee is responsible for the collection, collation, and publication of Association business items and items of interest to the general membership in the Association's quarterly newsletter. The Editorial Committee collects methods, relevant literature citations, and other materials that will assist the member in performance of their jobs. If you are interested in working on this committee, contact Roger at (415) 744-7051.

WAX YOUR SKIS, SPRING MEETING IN BEND, OR

The Spring meeting of the Association will be held the week of April 27-30 at the Inn of the Seventh Mountain in Bend, Oregon. On the program so far is a "Buried Bodies and Scattered Skeletons" class, unless the ground is frozen so hard that we can't dig them up. We are also arranging for guest speakers on topics relative to Fish and Wildlife Enforcement.

Information on the Spring 1993 Angling Symposium has not been sent out yet, but we've been told the general angling season in the streams will open Saturday, the 24th. We will confirm that before the meeting.

The marketing folks at Mount Bachelor Ski Area say they will be operating at close to 100% of total lifts through April and there will be plenty of skiing available.

For more information, contact:
Mike Howard
OSP Forensic Laboratory
63319 Hwy 20 West
Bend, OR 97701
(503) 388-6150
(503) 388-6241 fax

MEETINGS, TRAINING COURSES

40th Anniversary of CSFS

The Canadian Society of Forensic Science is holding its 1993 Annual Conference in Winnipeg, Manitoba, Canada during the week of September 8-12, 1993. For program information and meeting details, contact:

Ron Hrynchuk
RCMP Forensic Laboratory
621 Academy Road
Winnipeg, Manitoba R3N 0E7
CANADA
(204) 983-7376
(204) 983-6399 fax

Forensic Anthropology Course

The National Museum of Health and Medicine, Armed Forces Institute of Pathology, is holding its sixth annual Forensic Anthropology Course June 21-25, 1993 at the Maxwell Museum of Anthropology of the University of New Mexico in Albuquerque, NM. This five day course will survey the basic principles of forensic anthropology and provide updates on new techniques in the field. The course, designed for physicians, pathologists, dentists, and medical examiners, consists of a series of lectures covering various topics in the field followed by laboratory sessions emphasizing hands-on analysis of skeletal remains. A field exercise focusing on the location and recovery of human remains will also take place. For more information, contact:

Education Division
Armed Forces Institute of Pathology
Washington, DC 20306-6000
(301) 427-5231
(301) 427-5001 fax

Fatalities in Clandestine Laboratories

The Clandestine Laboratory Investigating Chemists Association (CLIC) is pleased to announce the presentation of a breakfast seminar titled "Fatalities Resulting from Clandestine Drug Manufacturing Laboratories" at the 45th Annual meeting of the American Academy of Forensic Sciences. The seminar will be held on Tuesday, February 16 at 7 a.m. in the Westin Copley Place Hotel. For more information, contact:

Terry Dal Cason
DEA North Central Laboratory
610 S. Canal Room 500
Chicago, IL 60607
(312) 353-3640

Delegates to Visit Russia and Hungary

The Ministry of the Interior of Russia has invited a delegation of forensic specialists to visit Moscow in September, 1993. The delegation will also visit Budapest, Hungary. The delegation will include law enforcement officers, criminalists and other specialists in the field of forensics. A team is now being formed under the leadership of Dr. Ilya Zeldes, Director of the South

Dakota State Forensic Laboratory. Dr. Zeldes organized and led a delegation of forensic specialists to Moscow in 1990 and hopes to expand and repeat the success of the first visit. Approximately fifteen (15) delegates and their spouses will accompany Dr. Zeldes to Moscow and Budapest, September 14-25, 1993. The program will focus on forensic sciences and practice as it pertains to criminal and civil investigations, court proceedings, law enforcement, education, research, and other aspects of forensics. Delegates will participate in a series of briefings, meetings, discussions sessions and field visits. In addition to the meeting agenda, social encounters such as banquets and receptions will be planned in each city. Sightseeing and cultural activities will also be scheduled. The project is being arranged under the auspices of the Center for International Projects. The Center works to promote cooperation and understanding through the exchange of ideas and information by arranging professional, scientific, technical and cultural exchanges between the people of Eastern Europe and the people of other nations. The Center, a private-sector effort headquartered in Moscow, works for the reintegration of the territories of the former USSR and Eastern Europe into the international community. Dr. Zeldes has not yet assembled a team but expects to have one organized early in 1993. "This visit provides forensic specialists with the opportunity to create or expand relationships with our colleagues in Russia and Hungary. This is an exciting chance for us to look beyond our borders and support our counterparts in Eastern Europe." For more information, contact:

Mr. Robin B. Dean, Director
Center for International Projects
600 Bypass Drive Suite 109
Clearwater, FL 34624
(813) 799-3903

Fall 1993 NWAFS Meeting in Boise

The Fall 1993 meeting of the Northwest Association of Forensic Scientists will be held October 19-22 at the Owyhee Plaza Hotel in Boise, Idaho. Possible workshops being considered include a half day weapon safety and ammunition course from Cascade Cartridge Industries (CCI); a 1 day Smith and Wesson armorer school; and a 1 day footwear/tire track evidence collection and preservation workshop.

For more information, contact:
Rick Groff
ID DLE Forensic Laboratory
2220 Old Penitentiary Road
Boise, ID 83712-8249
(208) 334-2231

Clandestine Laboratory Investigating Chemists Association 3rd Annual Technical Training Seminar

The Clandestine Laboratory Investigating Chemists Association (CLIC) is pleased to announce their 3rd Annual Technical Training Seminar to be held September 8-11 at the Holiday Inn Crowne Plaza hotel in downtown Memphis, Tennessee. This year's training seminar will include workshops on depth of analysis, bombs and booby traps, literature review, basic chromatography, and the ever popular "Bring Your Own Slides" session. Oral technical papers will be presented Friday and Saturday, and poster presentations will be offered Thursday afternoon. Included with the registration cost of the seminar will be a binder containing handouts for the workshops, technical papers, and poster session. In addition, a collection of literature regarding synthetic methods to manufacture and analysis amphetamine, methamphetamine, phenylacetone, and PCP will be provided.

For more information, contact:

Steve Nichols
Site Coordinator
Univ. TN Toxicology Lab
3 No. Dunlop Street
Memphis, TN 38163
(901) 528-6355

Roger A. Ely
Program Coordinator
DEA Western Lab
390 Main Street Room 700
San Francisco, CA 94105
(415) 744-7051 x29

JOB ANNOUNCEMENTS

Forensic Science Supervisor

The Department of General Services is seeking a qualified applicant to provide supervision and training in serology, for various levels of Forensic Scientists. Performs serological examinations on criminal evidence related to rapes, homicides and other criminal cases using state-of-the-art analytical methodologies, techniques and instrumentation. Prepares reports of findings for use by the criminal justice system and testifies in court as an expert witness. Communicates with medical officials on the handling of evidence. Applicant must possess a valid driver's license. Qualifications include a baccalaureate degree in biology, chemistry or related scientific field. An advanced degree is desired. Experience as a Forensic Serologist with court qualification in the areas of recovery of hairs/fibers and the forensic examination of blood and body secretions. Knowledge of laboratory safety procedures. Ability to supervise and train technical staff, train law enforcement personnel, distinguish color differences, maintain accurate records, analyze and interpret data, manage multiple tasks efficiently, establish work priorities, and develop sound conclusions from analyses. Knowledge, training or basic experience in the forensic application of DNA technology is preferred. Selected candidate must pass a background security clearance check. Application date closes

January 31, 1993. Salary range: $36,696-56,029 per year.

For more information, contact:
Department of General Services
Human Resources
805 East Broad Street, Room 117
Richmond, VA 23219
(804) 786-3055

CRIMINALIST II/III

The County of Santa Clara is seeking applicants for the positions of Criminalist II/III. For a Criminalist II, the applicant must be a graduate of an accredited college or equivalent education with a major in criminalistics, chemistry, biochemistry or related field and two (2) years of experience in the practice of general criminalistics/serology. A Criminalist III must be a graduate of an accredited college or equivalent education with a major in criminalistics, chemistry, biochemistry or related field and four (4) years of experience in the practice of general criminalistics/serology. A master's degree in criminalistics, chemistry, biochemistry or physics may be substituted for only one year of the required experience. Preferred course work in biochemistry, molecular biology and genetics, experience in DNA analysis techniques is helpful. Salary range: Criminalist II, $3521-4265/month; Criminalist III, $4066-4923/month.

For more information, contact:
County Government Center, Personnel
8th Floor, East Wing
70 W. Hedding Street
San Jose, CA 95110
(408) 299-2341

MINUTES OF FALL 1992 BUSINESS MEETING

The business meeting of the NWAFS was called to order by President Mike Howard. Minutes of the last meeting were approved as published in the Newsletter.

Reports:

1. **Treasurer: Lionel A. Tucker**
   The Association's books were audited at this meeting.

Expenses (October 1991- October 1992):		
Newsletter		$1880.00
Meetings:		
Coeur d'Alene (loss)		$3800.00
Advance for Boise and Bend meetings		$1100.00
Speakers:		
Workshop, Peter McDonald		$1200.00
Speaker at Portland meeting		$900.00
ABC:	Dale Mann expenses	$1720.00
Assistance:	officer's attendance	$600.00
Income:		
Dues collected:		$680.00
Interest:		$490.00
Totals:	Checking	$2900.00
	Money Market	$11486.00

2. **Membership: John Bowden**
   The following members were promoted to Regular members:

Kathleen M. Andrews	Jane E. Aunan
Charles S. Baker II	Steven P. Banerian
Michell M. Bird	Janeice L. Fair
Kevin D. Fortney	Helen R. Griffin
Jerry Massetti	Matthew Noedel
Martin G. Ols	Ray Pellegrin
Denise Richardson	Nizar Shajana
Terry Hanson	Robert J. Shem
Charles E. Solomon	William M. Schneck
Enrico Togneri	

The following members were promoted to Associate members:

William F. Gergits	Ann M. Hoffman

The following members were reinstated to Regular from Temporary Corresponding members:

Allen Garrett	Bob Martin
Art Terkelson	

The following members requested membership change to Corresponding member:

Julie Graham	Laurie Rawlinson

The following member resigned from the Association:
Dorothy Northey

The following applications for Regular membership were accepted:

James G. Bixby	Terry M. Coons
Michael Croteau	Julie A. Doerr
Maria Fassett	Eydie S. Johnson
Karen L. Kinchloe	William Moriwaki
David M. Northrop	Brian E. Ostrom
Mariam J. Parangot	Catherine L. Rucker

Gordon O. Rutter
Natalia P. Urtiew
James J. Weigand
Steven W. Smartt
Cecelia von Beroldingen

3. Election of Officers:

President:	Ken McDermott
President Elect:	Don Wyckoff
Secretary Treasurer:	Lionel Tucker
Member at Large:	Larry Campbell

4. Newsletter: Roger Ely

Informational disk exchange between regional associations has begun. All information will be published in our Newsletter. A history of the early days of NWAFS will be forthcoming. George Ishi has volunteered to prepare this epic document.

5. Technical Advancement: Robert Thompson

The proficiency testing program involved 34 governmental laboratories and 6 private laboratories. In addition, the California Fish and Game Laboratory has requested participation. The program lost one agency as a result of the "dissolution" of the NIS laboratory in Pearl Harbor, HI.

Only one test was completed this year, primarily due to a job and residency change to Seattle, WA by the committee chairman. With renewed vigor, however, the upcoming year should be very productive in the area of proficiency testing.

Members should have already received new drug, firearm, identification, and arson proficiency tests with a tire print test to be forwarded in the near future.

A summary of the urine toxicology test:

a. 12 sample sets, each containing 3 urine samples were sent out.
b. 5 response set were returned.
c. The laboratories were asked to identify possible drugs in the urine sample. If the laboratory routinely quantified drugs, that result was to be reported as well.
d. The submitting laboratory had a second reference laboratory independently quantify the spiked urine samples.
e. No laboratories misidentified a drug.
f. 4 laboratories confirmed the drugs by GC/MS
   Screening methods:
   EMIT
   TLC
   RIA
   GC
   Spot Test
g. 3 of 5 laboratories used a combination of screening tests; one laboratory used EMIT only; one laboratory used RIA only.
h. One laboratory using GC/MS confirmation did not detect one drug in two of the three samples and was fully correct in the third sample.
i. The one laboratory that quantified the urine samples gave results that were considered to be inaccurate by the reference laboratory results.
j. No comments or problems were noted in the returned responses.

6. Continuing Education: Arnold Melnikoff

This has been a bumper year for library requests as there were 18 requests for educational materials by members, with only four from outside the Association.

7. ABC: Dale Mann (see report in Newsletter)

8. Old Business:

a. The Spring 1993 meeting will be held in Bend, Oregon during the week of April 27-30 at the Inn of the Seventh Mountain resort. At this time, a buried body workshop planned.

b. The fall meeting will be held in Boise the latter part of September.

c. There was a discussion concerning a Resolution handed to the Executive committee and the membership prior to the business meeting (see text in Newsletter). Many members expressed their concern and disappointment in the manner it was presented. An issue as important as this should be presented to the entire membership for consideration using the Newsletter as the vehicle. It must be remembered that the Association still has a commitment until the Spring of 1994 to send a representative to the ABC meetings. A motion was passed to table the discussion on the Resolution until after New Business.

9. New Business:

The Fall 1994 meeting to be a joint meeting with the Canadian Society of Forensic Scientists. The Spring 1994 meeting will be in the Bay Area and hosted by the DEA Lab.

A motion to adjoined passed.

ABSTRACTS OF PAPERS PRESENTED AT FALL 1992 MEETING

General Session

The following technical papers were presented during the general session of the Fall 1992 meeting of the Association.

"Developing Match Criteria for RFLP Analysis: II. Establishing Match Tolerance Limits for Forensic Samples"

Cecilia H. von Beroldingen*, Terry M. Coons, Randall L. Wampler, James G. Bixby, Robert M. Thompson and Elizabeth A. Carpenter

An asymmetric matching rule for RFLP analysis was developed based upon studies of measurement variation observed in a variety of biological samples derived from a single donor. These samples included bloodstains, vaginal swabs, buccal swabs, hair, and semen. DNA was extracted and subjected to RFLP analysis using VNTR probes. Comparisons were made between fragment sizes in various sample types relative to a reference bloodstain and were expressed as a percent difference. Results indicate that for the various samples tested, fragment sizes tend to migrate faster than the corresponding fragment in the reference bloodstain from the same individual. The data were used to establish a matching rule in which the DNA patterns of an evidence sample and a reference blood sample are declared a match if the fragment sizes in the evidence sample are no more than 4% smaller or 3% larger than those in the reference blood.

"Mistress Verna's Pleasure Palace"

Larry W. Campbell

A sudden death reported to the Vancouver Coroners Office revealed evidence of an organized S & M, bondage business. Subsequent investigation disclosed information that would be relevant to criminal investigations but may be overlooked at the time. During the course of the analysis, a second person involved in the business also died. This paper will review the overall inquiry and subsequent conclusions.

"Developing Match Criteria for RFLP Analysis: I. Sources of Measurement Variation"

Terry M. Coons*, Randall L. Wampler, James G. Bixby, Robert M. Thompson, Cecilia H. von Beroldingen and Elizabeth A. Carpenter

In developing a matching rule for RFLP analysis of forensic samples, it is critical to determine the extent to which two restriction fragments may differ in length and still be consistent with coming from the same donor. To address this question, we have investigated various sources of measurement variation by evaluating 1) variation associated with replicate sizings by the computer-assisted image analysis system, 2) variation in repetitive analyses of a known control DNA, 3) variation in repetitive analyses of bloodstains from the same individuals, and 4) differences in fragment sizes obtained from several biological sample types from the same individual relative to the corresponding fragment length in a reference bloodstain. These studies demonstrated that the largest amount of variation was observed in measuring fragment lengths in different biological samples relative to a blood standard. Implications of these results will be discussed.

"Current Analytical Techniques Utilized in the Materials Analysis Unit, FBI Laboratory"

James E. Corby

This presentation will cover the accepted protocols used in the Materials Analysis Unit of the FBI Laboratory for the forensic examination comparison and identification of physical evidence consisting of paints, plastics/polymers, tapes, soils, glass, and explosives. An overview of the instrumentation utilized will be presented and confirmation techniques discussed. Some actual casework examples will be highlighted.

"Making Sense out of Trace Evidence: Sampling and Evaluation"

Chesterene Cwiklik

What is trace evidence? How did it get there? What does it mean? What doesn't it mean. Trace evidence is evaluated in a context provided by information about people and places associated with the case. A checklist for case information will be presented, and several defining concepts of trace evidence discussed:

1. The debris in an environment is characteristic of that environment.
2. The debris on a person and on the person's clothing reflects that person's habits and environment.
3. When objects come into contact, a transfer of material occurs (Locard's Theorem).
4. When a transfer of materials occurs upon contact, the material transferred includes debris.

How does a scientist decide what to test? What are some characteristics of a sample? A sample is a part of something, whether it be a questioned sample or a standard. Three types of samples will be discussed: evidence samples, samples which provide background information (controls), and comparison samples (standards). Four types of sampling methods can be employed: representative sampling, sampling to include a range of variation, area sampling, and random sampling. Of special

importance to trace evidence is preventing contamination. Some reference points for assuring the integrity of small particle evidence will be included in the discussion.

"The Use of GC/IR/MS for Analysis of Drugs of Abuse"
Wayne P. Duncan

The analysis of illicit drugs requires the very highest level of confidence in assigning structures to components of unknown mixtures. A mixture of amphetamine and several of its isomers were analyzed by GC/FTIR/MS. Visual comparison of the mass spectra indicated that most of the isomers could be positively identified by mass spectral data alone. However, a few of the isomers had very similar mass spectra and could not be positively identified visually or by a library search of a mass spectral data base. On the other hand, the isomers with very similar mass spectra were readily confirmed by their unique infrared spectra. Several "real world" samples involving designer drugs were also analyzed, including a confiscated clandestine laboratory reaction pot mixture. In addition, the analysis from an actual human urine sample will be discussed.

"Fundamentals of Photomicrography"
Bob Fasulka

This presentation will cover the steps necessary to produce a good photomicrograph, including focussing procedure, exposure requirements, reciprocity failure, illumination, color temperature, film requirements, and color balancing.

"AmpliType HLA DQ_ and PolyMarker DNA Typing Systems"
Nicola J. Fildes*, P. Sean Walsh, Vince Phillips and Rebecca Reynolds

The AmpliType^R HLA DQ_ Forensic DNA Amplification and Typing Kit uses the Polymerase Chain Reaction (PCR) to amplify a polymorphic region of the Human Leucocyte Antigen DQ_ gene. Six alleles are subsequently detected using immobilized sequence specific oligonucleotide probes. The discrimination power of this system is _ 0.94, depending on the population. Samples containing minute quantities of DNA or substantially degraded DNA, which frequently are not amenable to RFLP typing, can be analyzed using this DQ_ typing system. The AmpliType DQ_ Typing Kit is currently being used in casework in greater than fifty-five forensic laboratories in the United States and over ten laboratories in Europe. DQ_ results have been accepted in over 80 court cases in twenty-three states. The AmpliType^R PolyMarker typing system has been developed to increase the discrimination power of PCR-based forensic DNA typing. The PolyMarker system uses the PCR to coamplify six genetic loci, including DQ_. The loci are then detected using immobilized sequence specific probes; five of the loci are detected on one typing strip and DQ_ is detected using an AmpliType HLA DQ_ typing strip. The combined discrimination power for these six loci, obtained from a single amplification reaction, is 0.9994-0.9997. An overview of the AmpliType HLA DQ_ and PolyMarker typing systems and validation studies will be presented. Also, a summary of the laboratories currently using the DQ_ kit and the casework history will be discussed.

"Picture, Archival and Transmission Discussion"
Peter Gits

I will be discussing advances in imaging archival technology allowing unlimited image storage capabilities on standard IBM PC's. There will also be discussions on how you can incorporate existing photographs and documents and tie them to the captured images. Discussion regarding new products available on the market, equipment required to start advances in voice-mail which can be tied to images, and everything that can be sent over a network or through standard phone lines to a remote site - even how images can be captured and faxed immediately to another location. What standard off-the-shelf software products can produce documents and reports using the images from an archival system. Advantages of imaging archival systems over standard polaroid prints and what color video printers are available.

"Evaluating the "Steepling Effect" in Breath Alcohol Analysis by Means of Simulated Data"
Rod G. Gullberg

The "steepling effect", large positive and negative excursions in data over time, are a concern in forensic breath alcohol analysis. Hypotheses have been advanced, largely biological in nature, to explain this phenomenon which becomes an issue in driving while intoxicated cases, particularly with results near the "per se" level. The methods by which data are collected and treated appear to explain an important component of the variability. Assuming normally distributed breath alcohol values, simulated data was generated according to a typical breath alcohol concentration (BrAC) time curve defined by: $B=B_0(1-e^{kt})-\beta t$. Simulated data was generated for BrAC time curves according to four different data collection protocols: (1) single analysis/two digit, (2) mean of duplicates/three digit, (3) single analysis/three digit, and (4) mean of duplicates/four digit. Generated profiles were fitted to the original function by nonlinear regression with residual sum of squares and R^2 evaluated to determine magnitude of variability. The performance of single analysis truncated to two digits produced the greatest variability ("steepling") with RSS = 0.00202 and $R^2 = 0.972$. Performing three digit duplicates and then plotting the mean to four digits resulted in the least variability with RSS = 0.00053 and $R^2 = 0.992$. Data collection and treatment have significant influence on the variability or "steepling" phenomenon and must be considered before proposing other biological explanations. These factors must be considered when both reading the literature and designing experiments to explain alcohol kinetics from breath alcohol analysis.

"Electronic Pressure Control for Split/Splitless GC Injectors"

Stephen Harnos

Electronic pressure control (EPC) for capillary columns is discussed with the emphasis on split/splitless GC injectors. The EPC can be operated in several modes, including constant pressure, constant flow, vacuum compensation, pressure programming and pressure programming followed by constant flow. Each of the modes of operation are discussed. Advantages and disadvantages are illustrated with chromatographic examples.

"The Armed Forces DNA Identification Laboratory and the Department of Defense DNA Registry"

Demris A. Lee

The military established the Armed Forces DNA Identification Laboratory (AFDIL) in February of 1991 during Operation Desert Storm. Antibody profiling, PCR dot/blots and AmpFLP analysis were performed. The AmpFLP testing was performed through contractors and marked the first time AmpFLP analysis was used for casework in the United States. AFDIL casework and the current status of the laboratory will be described. DNA typing methods under investigation include: PCR dot/blots, AmpFLPs, Gene Scanner, MVR, OLA, mitochondrial DNA sequencing, capillary electrophoresis, and mass spectrometry. The DoD DNA Registry consists not only of the AFDIL but also of a DoD DNA Specimen Repository of military service members which will also be presented.

"Variations on Charcoal Strip Exposure for Adsorption/Elution Recovery of Flammable Liquids"

Matthew L. Noedel* and Dale C. Mann

Adsorption onto charcoal strips and subsequent elution with appropriate solvents has been shown to be an effective method for the recovery of accelerants in arson cases. The importance of how a charcoal strip is exposed to the accelerants has not been fully documented. Various charcoal strip exposure techniques are presented and their effectiveness of sample recovery compared.

"Detection of the Organic Constituents of Gunshot Residues and Explosives Using Micellar Electrokinetic Capillary Electrophoresis (MECE)"

David M. Northrop* and William A. MacCrehan

A MECE technique has been developed to separate and identify the organic components of gunshot residues (GSR) and explosives. A standard mixture of 26 common constituents can be separated in under 10 minutes using an SDS/Borate buffer and a 100 µm diameter capillary, providing efficiencies of 300,000 plates/m. Selected wavelength UV/Visible detection provides detection limits in the low pg range and can be used to provide positive compound identification by comparison to tabulated absorbance profiles. Characteristic propellants, stabilizers and plasticizers of six reloading powders and four plastic explosives were determined by MECE. Application of MECE to GSR detection was done using masking tape sample collection to minimize analyte losses and coextracted matrix interferences that were found with the use of solvent swabs. The addition of a non-volatile "keeper", ethylene glycol, to the tape extraction solvent prevented analyte loss upon evaporative concentration of the extract. An internal standard, ß-naphthol improved quantitative precision of the MECE analysis. In test handgun firings, GSR's (amounting to less than 0.1 µg) were collected from the shooting hand and analyzed by MECE. GSR constituents including nitroglycerin and ethylcentralite could be detected and the pattern could be matched to the unfired gunpowder used. However, we found that the constituent pattern varied somewhat between gunpowder particles, necessitating careful sampling and interpretation if matches of the GSR to the gunpowder manufacture and lot are to be made.

"Nuclei Isolation by the Use of a Non-ionic Detergent as an Aid to Extracting DNA from Decomposing Tissue Samples"

Robert M. Thompson*, Teresa H. Aulinskas, and Howard C. Coleman

DNA Analysis is a powerful tool for the forensic scientist in correlating biological fluid stains to individuals. DNA analysis extends the utility of parentage testing to the deceased and can aid in the identification of these individuals. Typically liquid blood samples or stains are collected as controls from the individuals to be tested. However, samples of good quality are not always available. It may be necessary to work with decomposing tissues or those that have been subjected to interment or archival preparation. A preparative method has been adopted that selectively isolates the nuclei from cellular and stromatic materials. The purpose of this method is to concentrate the DNA prior to nuclear lysis and digestion. This is achieved by the use of the non-ionic detergent Nonidet P40 (NP40) which lyses the cytoplasmic membrane while leaving the nuclear membrane intact. Following this procedure the DNA may be further purified using non-organic methods. Casework examples will be presented.

"A Summary of Restriction Fragment Length Polymorphism (RFLP) Analysis in the Oregon State Police Forensic Laboratory"

Randall L. Wampler*, Terry M. Coons, Cecilia H. von Beroldingen and Elizabeth A. Carpenter

The Oregon State Police Forensic Laboratory began accepting cases for RFLP analysis as of February, 1992. To date, 18 cases have been analyzed. Typing results were obtained in all cases. Fifty percent of the analyses completed so far have resulted in excluding the suspect. A discussion of several cases will be presented.

"Advancing the Approach to Particle Analysis: Immediate Desktop Access to Essential Reference Information Using the Advantages of Electronic Information Management"

Sandra J. White* and Stephen A. Shaffer

Electronic Information Management (EIM) represents a revolution in the manner in which information is stored and accessed. After a generation of use of microcomputers, we have begun to realize the potential of these machines as tools to make our office and laboratory lives easier, more efficient, and more enjoyable. Electronic documents, large databases, and complex data sets are now being organized with computers in ways that significantly enhance their value and ease our access to their information. The advantages of EIM include exhaustive indexing of text materials, rapid, flexible access to complex data, rapid navigation through complex documents to the particular information needed, and the integration of high-quality images with text and data. Many scientists have yet to experience the advantages of EIM and so have limited understanding of what it will mean to them in the future. The *Particle Atlas Electronic Edition (PAE²)* is an example of an electronic information resource which has the potential to significantly impact the work of those in criminalistics laboratories, particularly those engaged in trace evidence examinations. The advantages of EIM will be demonstrated using examples drawn from the PAE².

"A Practical Digital Imaging System for Evidence Documentation and Analysis"

James R. Wolfe

The Alaska State Crime Lab's criminalistics section has been using a Macintosh based digital imaging system for the past year to document evidence in situations where a quick black and white image is needed. This relatively low cost system ($1000 frame grabber, $2000 high resolution IR sensitive remote head camera, $2000 video print, free NIH "Image" image processing software) is simple to operate and is routinely used to quickly document evidence that was formerly sketched or photographed. Examples of applications ranging from documenting trace evidence on bullets to using the image processing capabilities to measure moose antlers from photographs will be presented along with a discussion on the practical aspects of implementing such as system.

Wildlife Symposium

Extensive illegal commercialization of wildlife parts and products has put increasing pressure on a small number of wildlife laboratory investigators. To provide an exchange of forensic methods in the divers are of wildlife serology, a Wildlife Serology Symposium was held on Wednesday, October 28 in conjunction with the Fall meeting of the Northwest Association of Forensic Scientists. Over 35 participants heard 13 invited presentations by authors from state, provincial, national and university laboratories. Representatives from labs in Alaska, Washington, Oregon, Idaho, Colorado, Alberta and Wyoming were in attendance.

The morning session focused on new developments in three areas of research - immunological, protein and DNA wildlife forensic methods. The papers discussed: 1) immunological identification, particularly methods involving monoclonal antibodies and enzyme-linked immunosorbant assay (ELISA) techniques; 2) protein electrophoresis used for species determination, especially involving native and exotic deer; and 3) DNA methods for gender determination, species determination of cooked meat products, and database development for individualization of wildlife species.

Methods commonly utilized in crime labs were reexamined and serious questions raised about misidentifying the taxonomic family of origin due to cross-reactivity. It was suggested that polyclonal antibodies only be considered a presumptive test.

Afternoon papers emphasized casework. The bear parts trade worldwide was discussed and several cases from British Columbia were detailed. A crime scene involving the death of several Columbian white-tailed deer was described from the investigating agent's perspective. A case involving aerial hunting in a national park in Alaska was described. Electrophoretic techniques were used to identify wolf and wolverine blood found at the scene; hair analysis corroborated the identification of wolverine.

The research trend in wildlife serology is moving from general protein stains for unique multi-band patterns to visualization of species-specific markers, both protein and enzymatic. At the molecular level, it is from multilocus to single locus probes, with increased use of the polymerase chain reaction (PCR) and DNA sequencing.

The symposium closed with an informal presentation on the improvement of courtroom exhibits so that complex serological tests can be better explained to a judge and/or jury. In the evening, the symposium participants reassembled at WhoSong and Larry's Mexican Cantina where they were heavily margaritized and subjected to musical high-jinx. Bill Adrian was amenable to hosting the next gathering of wildlife forensic scientists in Fort Collins, CO.

"Detection of Venison in Salami"

Peter Dratch*, John Amish, and Elaine Delsman

Some game butchers withhold part of deer carcasses brought in by hunters and use this venison to enhance salami and other products for sale to the public. This study sought to determine the detection limits of two immunological methods commonly used in forensic laboratories. Samples of ground beef and deer meat mixtures were made into salamis containing 100, 75, 50, 25, 10, 5, 2.5, 1.25, and 0.5% venison respectively. A control made of 100 percent beef was also included. A cooperating game butcher cooked the salamis using his routine procedure, smoking them to 80° C. Cores of samples from the salamis were tested with Cappel deer antisera by passive immunodiffusion and by cross-over electrophoresis. Immunodiffusion consistently detected venison in the salamis made with 90% beef and 10% deer while cross-over electrophoresis detected venison in salamis of 99% beef and 1% deer. Though the electrophoretic method detected more minute venison amounts, it also shows some false positives. Either procedure can be readily utilized to test

products from game butchers.

"Beware of Bear Antisera"
Peter Dratch

An eagle poison case from Iowa showed a positive reaction to Cappel bear antisera from the eagle crop, suggesting that it contained tissue from a member of the family Ursidae. As there are no known wild bears in the state, cross-reaction tests were conducted on the bear antisera (Organon Teknika Cappel Catalog No. 5118-1381, Lot No. 33390). The antisera showed positive precipitin band reactions with tissue homogenates from racoon, skunk, wolverine, river otter, and lesser panda. The reaction bands do not show chevrons of identity with these other species as they do with black bear, grizzly and polar bear standards. The bear antisera did not react with homogenates from badger, marten, fox, wolf, or members of the deer family. Subsequent isoelectric focusing on the Phastgel system indicated that the tissue in the eagle crop had a GPI banding pattern consistent with racoon meat and inconsistent with material from North American bears. These results suggest that confirmatory Protein or DNA analyses should be conducted before identifying evidence immunologically as bear meat.

"Monoclonal Antibodies Against Elk, Mule Deer, White Tailed Deer, and Antelope Albumins"
Robert P. Ellis*, Roberta J. Todd, Karin L. Cannizzo, William J. Adrian, E. Lee Belden, Robin A. Schamber, Rafael A. Neives and Michael E. Himmel

Albumins from elk, mule deer, white tailed deer and antelope were purified and utilized as antigens for monoclonal antibody (MAb) production. To date, fusions have been prepared against mule deer (MD) and elk (EL) albumins. The MAbs produced by clones derived from the above fusions have exhibited a wide variety of species specificity. Some clones produce MAbs reactive with MD, EL, AN, white tailed deer (WT) and moose (MS) albumin or serum, but negative against bovine serum albumin (BSA). Three clones derived from MD and EL fusions do not react with either BSA or ANA, while another reacts strongly with WT serum but very weakly with MDA and ELA. Another MAb reacts with MDA, MS serum, WT serum, and BSA, but not with ANA or ELA. One clone produces MAb strongly reactive with MDA and WT serum, weakly reactive with ANA, BSA and MS serum, but nonreactive with ELA. A recently derived clone, produced from an ELA fusion, reacts very strongly with ELA, with WT serum, weakly with MDA and ANA, and not at all with BSA. The ultimate goal in the above collaborative research is to produce MAbs which can be utilized to specifically identify tissues and/or tissue residues originating from antelope and various members of the deer family. The availability of such species-specific MAbs will enhance our ability to make quick, accurate identification of such tissues.

"DNA Fingerprint Analysis of Endangered Wildlife Species for Population and Individual Typing"
Steven R. Fain

Synthetic oligonucleotide probes corresponding to the core sequences of three human mini-satellites were assessed for their ability to detect individual specific differences among the DNAs of selected endangered wildlife species. Chemiluminescent detection was used to generate multi-locus DNA fingerprints of the north American black bear (*Ursus americanus*, CITES Appendix II), North American elk (*Cervus elaphus*, Appendix III), Pacific walrus (*Odobenus rosmarus divergens*, Marine Mammal Protection Act) and Mexican wolf (*Canis lupus baileyi*, CITES Appendix II). The average proportion of restriction fragments shared between individuals from a given locality for a single probe ranged from 0.33-0.79, whereas between-locality comparisons ranged from 0.19-0.52. The individuals used to found zoo populations of the captive Mexican wolf exhibited a fragment sharing frequency of 0.70. Data such as these are essential for typing evidence samples in incidents of game poaching, pet trade, and animal parts smuggling.

"Protein Electrophoresis: Fast, Faster and Phast"
Robert M. Hoesch* and Peter A. Dratch

Speed and reproducibility are often critical in serological forensic analyses. We have been using the Pharmacia PhastSystem to obtain protein electrophoretic information used in species identification. Native polyacrylamide gel electrophoresis (PAGE), isoelectric focusing (IEF) and immunoblotting have been tested on this system, resulting in reductions in gel run time and increases in consistency between gels. Isozyme markers glucose phosphate isomerase (GPI), phosphoglucomutase (PGM), erythrocyte acid phosphatase (EAP), and non-enzyme markers hemoglobin (HB) and albumin (ALB) have been analyzed using the PhastSystem and shown to be useful in differentiating species in the families Cervidae and Ursidae. The Phastgel system is now routinely used for casework.

"Gender Determination of Mammalian Wildlife Species From PCR Amplified Sex-Linked Genes"
James P. LeMay* and Steven R. Fain

Presently, the sexing of tissues of most non-primate mammals is limited to cytological chromosome analyses. However, this technique requires the costly establishment of cell cultures which is difficult to apply to field collected samples. We will describe a new method for determining the gender of mammalian wildlife species that is applicable to forensically relevant trace amounts of bloodstain or solid tissue. The method utilizes the polymerase chain reaction (PCR) and characterizes both the X and Y chromosome-linked ZFX and ZFY zinc-finger protein genes, as well as the Y-chromosome linked SRY testes-determining factor gene. The amplification products are analyzed directly; i.e., neither restriction digestion or probe hybridization are required. Two products (446 bp: ZFX/ZXY, and 214 bp: SRY) are observed in amplifications of DNAs containing a Y-chromosome, while only one product (446 bp ZFX/ZFX) is

observed in DNAs without a Y- chromosome. Test results of bloodstain and tissue samples from six mammalian families (Antilocapridae, Cervidae, Homidae, Odobenidae, Ovidae, Ursidae) will be presented.

"IEF Discrimination of Caribou, Moose, and Elk"
J. Scott McKibbin* and Peter A. Dratch

In wildlife law enforcement cases involving species identifications, a battery of electrophoretic separations of various proteins are used to systematically exclude the evidence from all but one of the species of a particular family. Isoelectric focusing provides a refinement of conventional electrophoresis in determining species of origin. This study used isoelectric focusing on a pH gradient of 5.0 to 8.0 with the histochemical staining for glucose phosphate isomerase (GPI). Previous work by Baccus et al (1983) showed a fixed GPI difference between elk and other North American cervids; Dratch (1983) showed that the elk allele is not fixed in European red deer. Pex and Wolfe (1985) reported a more anodal allele in black-tailed deer and some mule deer. The previous research has reported a common banding pattern for caribou and moose. In this study, 75 caribou representing four subspecies and four localities in Canada and Alaska were analyzed. All 75 had the same isoelectric point, extrapolated to pI 7.2. By the same method, moose and white-tailed deer had GPI pI of 7.4 and elk showed had pI of 7.8. Black-tailed deer and mule deer showed polymorphic banding with alleles of pI 7.2 and 7.4. This focusing method allows caribou in Alaska to be differentiated from native moose and introduced elk.

"Assessment of a Commercial ELISA Kit for Cooked Muscle Tissue Speciation"
Tommy D. Moore*, E. Lee Belden and Joni Triantis

An Enzyme-Linked Immunosorbent Assay (ELISA) utilizing a heat resistant tissue glycoprotein antigen (ELISA-TEK Biokits for cooked samples) was tested for sensitivity and crossreactivity on cooked domestic and game species meat extracts heated to 94 degrees Celsius for 20 minutes. Beef, sheep, and pork biokits proved to be specific with minimal color change on white-tailed deer, mule deer, pronghorn antelope, moose, and elk. The sheep biokit cross-reacted with bighorn sheep. As little as 1% cooked beef, sheep, and pork was detected in mixtures with cooked wild species. A somewhat higher background color development occurred with mixed samples and as well, mixing of samples caused a somewhat reduced color intensity in positive wells. By using an ELISA plate reader, the results were still readily interpreted. Higher fat concentrations, as present in ground meat samples, did not appreciably alter results. The ELISA test is designed for use in industry quality control laboratories equipped with the proper instruments. The assay appears to be accurate, sensitive, and offers a test format that might be adapted for game species. ELISA-TEK™ is a product of ELISA Technologies, Inc., One Progress Boulevard, Alachua, Florida 32615, (904)377-7071.

"The Forensic Identification of Individual Deer Using DNA Probes"
Jerry L. Ruth

The mission of the USFWS Forensic Lab is to provide scientific support for the enforcement of wildlife laws, and for the management of endangered or threatened species. DNA analysis is used to identify populations or individuals, and for measurement of genetic diversity. To determine the ability of multilocus DNA probes to 'individualize' animals, representative white-tailed deer (WTD) were screened using three multilocus probes and eight human 'specific' unilocus probes. The format of the test utilized enzyme-labelled oligonucleotide probes and chemiluminescent detection. At least four probes showed high resolution multilocus discrimination: f33.15; f33.6; MS-1 (D1S7); and CMM101 (D14S13). These probes were tested against 230+ WTD from seven regions throughout the U.S.. The testing included endangered Columbian WTD from the Northwest, and 40+ mother-fetus pairs. The bandsharing fractions in non-Columbian WTD range from 0.22-028; in Columbian white-tails, observed bandsharing is higher (_0.59). As a result of the high degree of polymorphism observed, the probability of two unrelated white-tailed deer having the same profile is smaller than 1.2×10^{-8}, or 1 in more than 78 million, using a single probe. For forensic applications, this allows the routine 'individualization' of white-tailed deer.

"Characterization of Ursidae Gall Bladders by HPLC and TLC Analysis of the Bile Salts"
Jo Ann Shafer* and Edgard O. Espinoza

Bear gall bladders and the bile that they contain are products valued in Asia for their purported medicinal properties. This demand has contributed to the illegal trade in bear parts. The increasing number of cases involving gall bladder identification was the impetus for the development of an analytical method for the characterization of bear bile. The analysis of the bile salts is performed by high pressure liquid chromatography (HPLC); inconclusive results with the HPLC are retested by thin layer chromatography. Analysis of over 1,000 gall bladders has revealed frequent fraud in the bear gall bladder market, with gall bladders from the domestic pig as the most common substitute. Recent information has indicated that there are bear farms in Asia for the sole purpose of extracting bile, and this has stimulated a second direction in bile analysis. The chemical analysis of the farmed bear bile displays a significantly different profile from the bile of a harvested wild bear. Several gall bladder and bile cases from the United States, Canada, and Asia will be presented that reflect the fraudulent gall bladder market, bear farms and the persistence of bear poaching.

"Identification of Species Using Restriction Digests of PCR Amplified Mitochondrial DNA"
Curtis Strobeck*, Brent Murray and Bob McClymont

Restriction site variation of the PCR product of the D-loop region of mitochondrial DNA in 14 ungulate species were examined. There exist sufficient variants which are unique to

each species so that species identification of a sample is possible. By using this PCR-based genetic marker system, forensic samples, some of mixed origin (i.e., sausages) were typed to species efficiently and accurately.

"Case Study: Identification of Furbearer Blood in a Cooperative State-Federal Investigation. Is There a Wolverine in the Woodpile?"

Jim Wolfe* and Peter Dratch

Investigation of a poaching scene within the boundaries of a national park in Alaska produced a number of blood and hair samples. Initial examination by the Alaska State Crime Lab could not identify several of the blood samples, though by elimination the possibilities of origin were narrowed down to a small group of furbearers (wolverine, marten, river otter, and wolf). All of these exhibited the same PGI mobilities using cellulose acetate electrophoresis. In a cooperative effort the USFWS Forensic Lab in Ashland accepted these samples for further characterization along with tissue standards of Alaska furbearers. This presentation will review this joint project between state and federal agencies. The unknown blood samples were finally characterized by the Ashland lab as wolverine and the results were corroborated by examination at the Anchorage lab of hair taken from the crime scene. Confounding results from both laboratories for one evidence sample were later explained by irregularities in evidence collection procedure.

"Case Study: Crime Scene Evidence Collection for Multiple Deer Species and Individuals"

Jerry Woods* and Leryl Brown

This case involves poaching of threatened Columbian white-tailed deer. Samples were confiscated from the suspects at two different times. Evidence included meat samples taken from two freezers at different localities, one whole deer and submerged parts of other deer, as well as bullet casings. Ballistics analysis to match shell casings from the crime scene and suspect's weapon was done at the Oregon State Police Crime Lab in Portland. Biological evidence involving species identification of meat and matching of meat from suspect's freezer and deer head obtained by divers from a slough was analyzed at the National Fish and Wildlife Forensics Lab in Ashland.

"Assessment of a Commercial Dipstick Type Immunoassay Kit for Muscle Tissue Speciation"

E. Lee Belden, Tommy D. Moore, and Joni Triantis

A dipstick albumin antigen based immunoassay for speciation of raw meat samples (DTEK) was tested for sensitivity and crossreactivity on domestic and game meat samples. The assay proved to be specific for the domestic species tested and no crossreactions occurred with the game species tested. As little as 1% beef and 5% sheep was detected in mixtures with uncooked game species meat extracts. A reduction of color intensity was noted in mixtures with game species, but the results were still easily visualized as positive for the species tested. Higher fat concentrations in extracts prepared from ground meat samples did not alter the assay. The DTEK assay is marketed to screen raw meat products and is available for beef, pork, poultry, sheep, horse, rabbit, and kangaroo. A test for 'deer' is reportedly under development. The test appears to be accurate, is fast (30 minutes), sensitive, easy to use, and is easy to interpret because of a colored, visual endpoint. It should however, be considered a screening or presumptive assay.

THE WEBER TEST
A COLOR TEST FOR THE PRESENCE OF PSILOCIN IN MUSHROOMS

Allen S. Garrett, Steven R. Siemens, and James H. Gaskill
Weber State College
Laboratory of Criminalistics
Ogden, UT 84408-1206

***(Editor's Note:** I received an inquiry the other day about the origin of the use of Fast Blue B as a color screening test for psilocin mushrooms. I really didn't have a clue where it came from. Thanks to Dick Smith and Terry Hanson of the Washoe County Sheriff's Lab, they provided me with a copy of the procedure which was presented at the Spring 1984 meeting of the Association in Coeur d'Alene, Idaho meeting. It is reprinted here for your information.)*

The popularity of hallucinogenic fungi has increased in the past few years. Along with the increased popularity, we see an increase in mushroom possession cases and mushroom buys by narcotics agents. Some of these mushrooms will be hallucinogenic, but many will not. In the Weber State College Crime Lab, over the past three years the ratio of controlled vs. non-controlled mushroom has been about 50/50.

Those of you who work with identification of controlled mushrooms know that it is no simple task. There are several factors that make such identification difficult:

1. There are many varieties of mushrooms, literally thousands of different species, of which only a few are hallucinogenic and not all of these are in the same genus.
2. Even with fresh mushroom samples, genus and species identification can be a real challenge unless one is well-versed in the identification and classification of mushrooms. When samples are submitted to the laboratory in a dried, crushed, and/or frozen state, botanical identification is almost impossible.
3. Psilocin and psilocybin are light and heat sensitive, and can decompose very quickly if handled improperly.
4. Most labs use analytical methods to identify controlled mushrooms. These methods can be challenging when trying to identify controlled components in hallucinogenic mushrooms.

Using gas chromatography to identify psilocybin and psilocin with an FID or hot wire detector can be very tricky. GC/MS is an excellent and quick procedure, but not all labs are fortunate enough to possess one. Sample clean-up and preparation for TLC, IR, or UV can take several hours. Because of these factors, much valuable lab time can be wasted on the analysis of bogus mushrooms.

At Weber State College Crime Lab, we have devised a simple color test to distinguish non-controlled mushroom samples in approximately two minutes. It is a preliminary test, and not designed as a complete analytical procedure. A negative test result, however, should eliminate any need for further testing.

The chemicals used react with the psilocin, which is typically present in the hallucinogenic mushrooms in much smaller quantities than psilocybin. Some literature reports there may be species of hallucinogenic mushrooms that contain only psilocybin. But in out test, we have not found any "magic mushrooms" that do not contain at least some psilocin. This may be due to the fact that psilocybin hydrolyzes very easily to psilocin.

Over the past two years, the Weber State College Crime Lab has tested all mushrooms samples that have been submitted, with very good results. In no case did a sample test negatively with the color test and subsequently show the presence of psilocin by TLC and IR.

Recently, the mushroom collection of Brigham Young University was tested with this color test (a total of 55 different species) as well as numerous unidentified species collected from our local environment, with no false positive or false negative results being received.

The procedure is a simple one, consisting of a two-part chemical addition to a small fragment of a mushroom.

Procedure

Make fresh daily a 0.1% solution of Fast Blue B or Diazo Blue B (*o*-dianisidine, tetrazotizod) by dissolving 0.01 g in 10 ml of distilled water. Two to three drops of this solution is added to a sample of mushroom at room temperature. The solution will turn red if psilocin is present.

One to two drops of concentrated hydrochloric acid is added to the (red) solution of mushroom sample and Fast Blue B reagent. In the presence of psilocin, the solution will change from red to blue in color.

If psilocin is not present, no color is obtained or, in a few

incidents, a pink or orange color will appear with no change in the HCl addition. Where colors were obtained, there were not confused with those of a positive test for psilocin.

We, at Weber, feel that this is, and can be used as, a valid preliminary screening test for the presence of psilocin in mushrooms.

Thanks to BYU Botany Department for mushroom samples, as well as the article by John Kearns of the Spokane, Washington lab on the "Isolation and Identification of Psilocin From Psilocybe Mushrooms."

APPLICATION OF A REWASHING TECHNIQUE TO ENHANCE ABSORPTION-ELUTION

JOHN N. HOUDE, B.S.
VENTURA COUNTY SHERIFF'S CRIME LABORATORY
800 S. VICTORIA AVE.
VENTURA, CA 93009

ABSTRACT

The absorption-elution thread technique can yield more information when bloodstained threads are rewashed after the initial procedure, and then subjected to the elution technique again. Difficulties due to sweat contamination may be thus resolved.

Early work by Siracusa [1] proved that dried blood could be treated with A or B antisera and then washed and heated, thus releasing absorbed antibodies. These antibodies could then be mixed with A or B reference cells and any agglutination would be indicative of the ABO group of the original sample. A careful reading of Siracusa reveals an indirect suggestion that this process could be applied more than once for the same sample, following a suitable washing step.

The process thus described became the basis of the absorption-elution as presented by S. S. Kind [2], and then modified by Howard and Martin [3]. In 1973, Bashinski and Davis [4] briefly mentioned that the same sample could be tested repetitively if necessary, but their procedure is not used by this laboratory.

Frequently, this laboratory will receive articles of evidence which have been either worn or handled by individuals who secrete their blood groups in body fluids such as sweat. Typical examples include knife handles and trousers. During the course of a violent event, blood from another person may be deposited on the evidence, and it is necessary to distinguish this blood from the sweat donor. Sometimes, especially in the instance of knives, there will be no clean areas from which to take a control sample.

Clean cotton threads are used to collect blood from the evidence, or in the case of stained fabric, threads from the original cloth might be used. The samples and controls are tested in the manner of Culliford [5].

One of absorption-elution's strengths is that of sensitivity. Unfortunately, this can be one of its weaknesses as well, in that contamination from sweat may cause a rather strong agglutination.

Once the first reading of the threads has been done, the entire plate containing the threads is rinsed with copious amounts of chilled saline. The plate is then blotted dry and fresh reference cells suspended in saline + 2% BSA is applied again. Then the entire plate is incubated in a moisture chamber at 56°C for a bit longer than the first time, five minutes more or so. Next, the plate is rotated for as long as 60 minutes. Using known blood samples as controls, it will become obvious when the unknowns are ready to be read.

Table 1 shows the results from an actual case. The agglutination was scored as follows: "-" no agglutination, "+1" rare clumps of cells, "+2" occasional clumps of cells, "+3" considerable clumping of cells and "+4" complete agglutination with virtually no free cells.

In the case illustrated above, it was necessary to distinguish between two bleeding victims who left bloodstains on various items at the scene. Blood found on a piece of cardboard was typed as group AB, although without the rewash step the results would be less certain, since the control areas also gave a strong agglutination. Likewise for a bloodstain found on the floor which was typed as group O, yet would have been difficult to interpret without the rewash due to the interfering group B substances present.

It is apparent that "genuine" blood group substances persist after a rewash step, whereas contamination due to environmental factors such as might be found on control samples does not. The type of substrate, and how well saturated the blood undoubtedly influences just how persistent the sample actually is.

Table 1. RESULTS OF ABSORPTION-ELUTION AND REWASH

ITEM	A	[rewash]	B	[rewash]	O	[rewash]
Bloodstain on cardboard	+4	[+4]	+4	[+4]	+4	[+4]
control area	+2	[-]	+3	[-]	-	[-]
Bloodstain on floor	-	[-]	+2	[-]	+4	[+3]
control area	+1	[-]	+4	[-]	-	[-]
A_2B control	+4	[+3]	+4	[+4]	+4	[+4]
O control	-	[-]	-	[-]	+4	[+4]

This laboratory has been using a rewashing step since 1984, and has found it to be invaluable in resolving difficult absorption-elution questions.

REFERENCES

1. Siracusa, V., "La sostanza isoagglutinabile del sangue," *Arch. Antrpol. Crim. Psichiatr. Med. Leg.*, 43 (4 ser. 14), 1923, pp. 362-364.
2. Kind, S. S., "Absorption-elution grouping of dried blood smears," *Nature*, 1960, Vol. 185, pp. 397-398.
3. Howard, H.D. and Martin, P. D., "An improved method for ABO and MN grouping of dried bloodstains using cellulose acetate sheets," *J. Forensic Science Society*, 1969, Vol. 9, pp. 28-30.
4. Bashinshki, J., and Davis, J. E., "A simple procedure for ABO typing of dried bloodstains on fibers by the absorption-elution technique," *J. Forensic Science Society*, 1973, Vol. 13, pp. 217-222.
5. Culliford, B., "The Examination and Typing of Bloodstains in the Crime Laboratory," *National Institute of Law Enforcement and Criminal Justice*, 1971.

ACKNOWLEDGEMENT

The author wishes to thank Edwin L. Jones, Jr. for suggesting the concept of this paper.

Reprinted with permission from the CAC News - Fall 1992.

A COMPARATIVE STUDY OF BLOOD AND BREATH DATA FROM THE SANTA CLARA COUNTY DISTRICT ATTORNEY'S CRIME LABORATORY

PAUL BAUGHMAN

INTRODUCTION

The C.M.I. Intoxilyzer 5000 has been in service in Santa Clara County since May 7, 1990 replacing the C.M.I. 4011-A Intoxilyzer. The data presented in this paper is an "in-field" correlation study of blood and breath samples taken from DUI suspects during a period starting May 23, 1990 to April 22, 1991.

METHOD

Over a one year period, blood and corresponding breath test results were collected. This produced 326 paired data points with a BAC greater than 0.00%. An additional 33 paired data points were omitted because the blood and breath BAC results were 0.00%.

The blood samples were analyzed by direct injection gas chromatography using a Hewlett-Packard 5720A gas chromatograph with FID detector and Carbowax 1500 packed column. Breath testing was conducted on various in-field Intoxilyzer 5000 evidential breath testing instruments. The blood alcohol levels in this study ranged from 0.03% to 0.31% (w/v).

The treatment of the collected data involved certain considerations before a statistical analysis was performed. First, the mean of both breath results was considered. Secondly, the mean of the blood results was considered. The results were then looked at as a whole with no consideration for time between breath testing and blood sample collection (Figure 1). Blood and breath results that were collected more than 20 minutes apart were omitted in Figure 2. Blood samples that were drawn within twenty minutes of the breath tests were considered to be close to simultaneous sampling. No correction for alcohol elimination was used in either figure.

RESULTS AND DISCUSSION

The Intoxilyzer 5000 showed a definite ability to determine alcohol concentration in breath. In many instances, the breath test result is lower than the actual blood test result. This confirms that the 2100/1 ratio is low for the majority of the population tested.

In both figures, the blood/breath results show that the mean breath result is 0.01% lower than the blood result. The standard deviation in Figure 1 is ±0.024. The blood/breath BAC difference in 90% of the population tested is 0.00% with an 0.01% difference in 98% of the population. With the 20 minute sampling consideration in Figure 2, the blood/breath BAC difference in the 90% and 98% population is the same as Figure 1 with a standard deviation of ±0.013.

The 0.02% and 0.03% difference between blood/breath time corrected results (Figure 2) may reflect elimination variations or individuals in the absorptive phase.* The breath results that were 0.06% and 0.04% lower than the blood results (Figure 2) may be attributed to the failure of capturing a substantially alveolar specimen.

SUMMARY

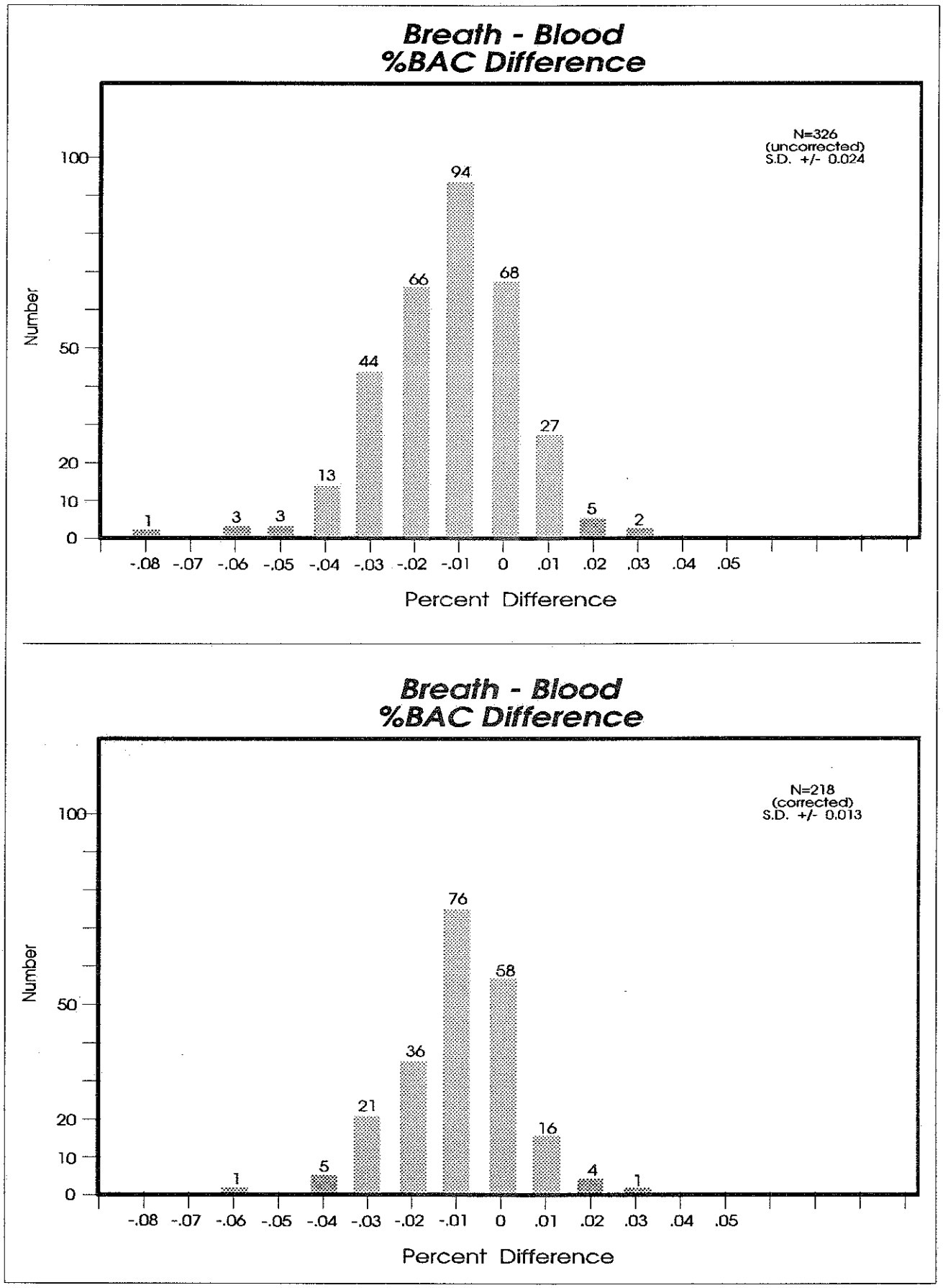
The results of this study compare favorably to other studies published in the scientific literature. The data supports the idea that the Intoxilyzer 5000 is a valid instrument for the use in evidential breath testing.

*The 0.03% and one of the 0.02% differences were determined from high blood alcohol level samples (greater than 0.23% BAC). The breath results in these samples are within 10% of the blood value.

REFERENCES

1. Dubowski, K.M., "Breath Analysis as a technique in Clinical Chemistry," *Clinical Chemistry*, Vol. 20, No. 8, 1974, pp. 966-972.
2. Harding, P.M., Lassig, R.H. and Field, P.H., "Field Performance of the Intoxilyzer 5000: A Comparison of Blood and Breath Alcohol Results in Wisconsin Drivers," *Journal of Forensic Sciences*, Vol. 35, No. 5, Sept 1990, pp. 1022-1028.
3. Mason, M.F., Ph.D. and Dubowski, K.M., Ph.D., "Breath Alcohol Analysis: Uses, Methods and Some Forensic Problems - Review and Opinion," *Journal of Forensic Sciences*, Vol. 21, No. 1, Jan 1976, pp. 9-40.

Reprinted with permission from CAC News - Fall 1992


Breath - Blood
%BAC Difference
N=326
(uncorrected)
S.D. +/- 0.024
Number
100
50
20
10
0
1
3
3
13
44
66
94
68
27
5
2
-.08 -.07 -.06 -.05 -.04 -.03 -.02 -.01 0 .01 .02 .03 .04 .05
Percent Difference
Breath - Blood
%BAC Difference
N=218
(corrected)
S.D. +/- 0.013
Number
100
50
20
10
0
1
5
21
36
76
58
16
4
1
-.08 -.07 -.06 -.05 -.04 -.03 -.02 -.01 0 .01 .02 .03 .04 .05
Percent Difference

FALL 1992 CAC SEMINAR ABSTRACTS

The following abstracts are for presentations made at the Fall 1992 California Association of Criminalists meeting in Ventura, CA.

"The Analysis of Dried Blood Samples by Tandem Mass Spectrometry"

Gary Davis
CA-DOJ Toxicology Lab
Sacramento, CA

In April 1989, Ramon Salcido, a Sonoma County winery worker murdered several people, including his wife and two of his young daughters. One piece of evidence collected by criminalists from our Santa Rosa regional laboratory was a shotgun shell box which was stained with the suspect's dried blood. 55 milligrams of this dried blood were submitted to our laboratory to determine if cocaine and/or its metabolites were present in the sample. A technique was developed for this analysis which utilized tandem mass spectrometry (MS/MS). The sample, plus dried blood standards, was reconstituted with saline and extracted at a basic pH with ethyl acetate. After extraction, the samples were derivatized with pentafluoropropionic anhydride. The samples were then analyzed for cocaine and ecgonine methyl ester (EME), an enzymatic metabolite of cocaine, utilizing positive chemical ionization and multiple reaction monitoring. The first quadrupole was set to transmit the molecular ions of cocaine and EME-PFP, 304 and 346 amu respectively. After an argon induced dissociation in a reaction region, the second quadrupole was set to transmit only the daughter ion of both compounds, 182 amu. Cocaine and ecgonine methyl ester were detected in the dried blood sample at approximate concentrations of 100 and 40 nanograms per gram respectively. The work done in this case led to the development of a method for the analysis of blood samples for cocaine and its metabolites in our routine driving under the influence cases.

"Ethyl Chloride: Possible Misidentification as Ethanol in a Blood Sample Analyzed by Headspace Gas Chromatography"

Pennie Lafferty
Orange Co. Sheriff
Santa Ana, CA

Using head space gas chromatography, ethyl chloride in a blood sample was quantitated as ethanol on three out of six occasions. The component tolerance and component % tolerance parameters on the gas chromatograph were set at 0.020 and 0.500 respectively to establish the acceptable window for the relative retention time of ethanol. Because ethyl chloride and ethanol had similar retention times and relative retention times, the sample fell within the acceptable ethanol range three times. To prevent ethyl chloride from being identified as ethanol, the component tolerance and component % tolerance were changed to 0.010 and 0.400 respectively. Using the new system parameters, mixtures of ethyl chloride and ethanol were identified and quantitated as ethanol only. The peak areas of the two components were additive and gave falsely elevated ethanol results; however, the mixtures had different retention times and relative retention times than that of ethanol or ethyl chloride alone. Using our current methodology, there was no apparent way to separate the compounds in mixture.

"Newly Discovered Evidence in the Deaths of Senator Huey Long and Dr. Carl Weiss"

Lucien C. Haag
Forensic Science Services
Carefree, AZ

On the night of September 8, 1935 a fatal confrontation took place in a marbled hallway of the Louisiana State Capitol building between Dr. Carl Austin Weiss and Senator Huey P. Long. Former Governor Long is believed to have sustained a single perforating abdominal gunshot wound from Dr. Weiss' Model 1910 FN .32 automatic pistol. Dr. Weiss was shot numerous times by Senator Long's bodyguards. Neither victim was autopsied, and shortly after this doubly fatal incident the files, photographs and physical evidence disappeared. Recently (1991), much of this material was found in the possession of Mabel Guerre Binnings, the daughter of General Louis Guerre—the Superintendent of the Bureau of Criminal Investigation in 1935. The items of physical evidence included Dr. Weiss' pistol with six rounds of vintage .32 automatic ammunition in the magazine and a single, fired vintage .32 automatic bullet. In October of 1991 the body of Dr. Weiss was exhumed, autopsied for the first time, and a number of bullets and bullet fragments were recovered which possessed surviving class characteristics and important trace evidence. This presentation will chronicle the recent discoveries in this long unsolved Southern murder mystery and illustrate the enduring value of physical evidence.

"Diversity in Crack Production for use in Sting Operations"

Lynn J. Willers
Los Angeles County Sheriff's Department
Scientific Services Bureau
202 W. Beverly Blvd.
Los Angeles, CA 90057

Due to the high number of drug related crimes in the Los Angeles area, various operations are frequently used to affect multiple arrests in the "war on drugs." The "reverse sting" is one such operation that utilizes the services of the crime laboratory. Forensic chemists are often requested to generate cocaine base from the hydrochloride salt, for use in narcotics investiga-

tions. As officers have indicated the need for a "crack" product with reduced cocaine content, cocaine base adulteration experiments were conducted to obtain products which would satisfy these criteria. Several adulterants were utilized in weight ratios of 2:1, 1:1 and 1:1.5 (cocaine base to adulterant, respectively). The products were compared against street samples of cocaine base in respect to their color, texture and homogeneity. Most products compared well, although a few demonstrated slight color differences. To determine the extent of product uniformity, five random portions from each were quantitated. Most of the quantitation results agreed with the expected values showing the adulterated products to be fairly homogenous. The products obtained demonstrate the ability to control the cocaine content as well as the appearance of the adulterated product. As the characteristics of crack cocaine can vary between geographical locations, the ability to provide products conforming to the request of the investigator, is clearly an advantage.

"Calvin Goddard, et al and the Criteria for Identification: An Historical Perspective"

Paul M. Dougherty
Ventura Sheriff's Crime Lab
800 S. Victoria Ave.
Ventura, CA 93009

Calvin Goddard is considered the father of modern Firearms Identification. This paper will review some of the steps that he undertook in order to develop his criteria for identification. From that point to the present day there will be an outline of the controversy over the criteria for identification and why much of it is due to a lack of understanding of the basic process by which an identification is made by a qualified firearms examiner.

"Frank's Greatest Hits"

Frank Cassidy
CA-DOJ Santa Barbara
820 Francis Botello Rd.
Goleta, CA 93017

Over the past 20 years, I have generated many unique ideas in several areas of criminalistics. These have helped me—and hopefully others—in saving time and lessening frustration while performing casework. Many of these suggestions have been published in early editions of D.O.J.'s TIELINE—before TIELINE was circulated to other laboratories outside of D.O.J. Thus, the information may not have been promulgated to laboratories outside of D.O.J. Also, some of the recently hired criminalists may not have had the chance to peruse issues of TIELINE where some of the articles were published. It is hoped that these ideas will help criminalists on the bench and also promote improved ideas and incubate seeds of originality to produce new improvements in the field of criminalistics. The hints and tips to be presented will cover the areas of blood alcohol, serology, trace evidence, firearms/toolmarks and some miscellaneous areas.

"GC-MS Analysis of LSD"

Raymond A. Schep and Hoa Duc Nguyen
Diagnostic Products Corporation
Los Angeles, CA 90045.

There is need for a reliable GC-MS method to determine LSD in urine using bench-top instruments. Immunoassay results and emergency room visits indicate that LSD is freely available for abuse. Efficient removal of interfering substances during extraction is required to detect LSD at the low dosage (100ug) allowed by its potency. An RIA positive sample is spiked with 20 ng/mL internal standard and buffered to a pH of 10. It is extracted with a 7:3

"Match Criteria Determination for RFLP-DNA Analysis Using Five Molecular Weight Zones"

Donald T. Jones, Daniel J. Gregonis and Donna J. Minnillo
Riverside/San Bernardino Regional Forensic DNA Laboratory
200 South Lena Road
San Bernardino, CA, 92415-0056

Prior to the use of Restriction Fragment Length Polymorphism (RFLP) technology on DNA from case samples, it is necessary to study the concordance between reference blood samples and forensic samples. A match criteria study will determine the acceptable examinations and statistical interpretation. Vaginal swabs from 72 sexual assault kits were examined as well as non-probative bloodstains from crime scenes. A differential extraction provided the vaginal epithelial cell DNA which was compared to the corresponding reference blood. The crime scene bloodstains were compared to reference samples from autopsies. All samples were processed according to our protocol and probed with a cocktail of four probes; YNH24, TBQ7, MS-1, and pH30. Corresponding bands between reference samples and stains were sized. The data were analyzed in groups relating to five zones of molecular weight sizes: less than 1250 bp, 1250 to 2499 bp, 2500 to 4715 bp, 4716 to 9416 bp, and greater than 9416 bp. For each zone the average relative difference between reference and forensic sizing was determined. A window of three standard deviations about the average relative difference provided the range for considering a match between two bands. Different criteria were determined depending on the stain type and whether the reference sample was analyzed on the same gel as the stain. The high molecular weight zone (greater than 9416 bp) had the highest range of variability, about a 13% window. The other molecular weight zones had windows ranging from 3 to 7 percent.

"DNA Analysis in the Riverside/San Bernardino Regional Forensic DNA Laboratory"

Donald T. Jones, Daniel J. Gregonis and Donna J. Minnillo
Riverside/San Bernardino Regional Forensic DNA Laboratory
200 South Lena Road
San Bernardino, CA 92415-0056

The Riverside/San Bernardino Regional Forensic DNA Laboratory opened for casework acceptance in April 1992 using Restriction Fragment Length Polymorphism technology. Preparation prior to this date involved several studies which included sample extraction protocols, match criteria determination, and population frequencies studies. Our extraction protocol follows that of the FBI with several modifications. These include the use of Centricon microconcentrators instead of ethanol precipitation, analytical gels run with circulation buffer but without ethidium bromide, Southern blots done on platforms, a hybridization oven, and membrane stripping without formamide. The match criteria were developed using the same approach as the FBI, examining epithelial fractions of vaginal swabs and comparing them to the female's standard blood. The membranes were probed with a cocktail of the four probes we use: YNH24, TBQ7, MS-1, and pH30. Additionally, several secondary standard blood samples from crime scenes were compared to the reference blood samples. Various zones of the gel were individually examined for differences between the stains and standards. Blood samples were collected from both counties and grouped into four categories: Caucasian, Hispanic, Black, and Other. At least 200 samples in each category were analyzed using sequential hybridization with the four probes. The data were examined by a population genetics expert who performed several statistical tests.

"Comparison of Centricon Microconcentrators with Ethanol Precipitation for Post Restriction Cleanup and Concentration"

Daniel J. Gregonis, Donna J. Minnillo, and Donald T. Jones
Riverside/San Bernardino Regional Forensic DNA Laboratory
200 South Lena Road
San Bernardino, CA 92415-0056

Because forensic samples are many times limited in quantity, care should be taken when selecting routine techniques in order to optimize recovery of the substance to be analyzed. This study compares the use of a standard (FBI protocol) ethanol precipitation versus a Centricon 30 microconcentration technique to purify and concentrate DNA following restriction with Hae III. K562 human cell line DNA was serially diluted prior to restriction for 5 hours at 37 deg. C with Hae III in 100 ul total volume. After restriction, 50 ul of the sample was transferred to a new Centricon 30 microconcentrator tube containing 2.0ml of TE-4 for Centricon dialysis and 50ul was transferred to a new 1.5ml Eppendorf tube for ethanol precipitation. Following the concentration of samples, a test gel was run to assure that the K562 restricted properly.

After the test gel, the samples were loaded onto an analytical gel for electrophoresis, Southern blotting onto a charged nylon membrane, sequential hybridization with four DNA probes, and autoradiography. Results on the autoradiographs show significantly stronger signal from the Centricon 30 concentrated samples when compared with the ethanol precipitated samples. Sizing data on the various samples shows that there is no significant difference in electrophoretic mobility between two concentration techniques. Because there is an increased recovery of the restricted DNA and no significant differences in the sizing of bands, it is highly recommended that Centricon dialysis be used in place of ethanol precipitation for post restriction cleanup of DNA.toluene:methylene chloride mixture. A Bond Elut Certify cartridge is treated as follows: 3 mL of 1:1 MeOH:pH 6 buffer, the LSD toluene extract, 1 mL HOAc, 8 ml MeOH, and 2 mL of fresh 2% NH4OH in EtOAc, from which the LSD is recovered by evaporation. 30 uL of BSTFA is added to the LSD and heated at 70deg C for 30 min. 3 uL of BSTFA is injected with scanning of ions 395, 293, and 253. EMV is increased by 300. The inlet temp is 270deg C, and the starting temperature of the 10 M HP-1 column is 175deg C, programmed 25deg C/min to 300deg C. Critical to success is the use of a new column, conditioned by injection of 1 ug of internal standard in BSTFA. The detection limit is 100 ng/mL. Of 11 RIA positive samples obtained from a metropolitan crime lab, all were confirmed positive, some samples testing as high as 22,000 ng/mL. The method has been used for 6 months.

"The Forensic Use of Polarized Light Photography"

Torrey D. Johnson
California Criminalistics Institute
4949 Broadway, Room A104
Sacramento, CA 95820.

Forensic scientists photograph difficult subjects under a variety of working conditions ranging from a well equipped photo studio to a night crime scene. Ring flash attachments may be used for even, shadow free illumination of otherwise difficult to light subjects. Polarizing filters are commonly used to control reflection. A combination of the two techniques, the use of a ring flash with a polarizing filter, yields an extremely useful technique for the forensic scientist/photographer. The ring flash technique is especially useful when documenting three dimensional, hi relief features where normal closeup flash photography produces deep shadows. In combination with the polarizing filters, it readily allows photography of flat, reflective materials such as printed material and art work that might otherwise be plagued with "bounced" reflections.

"Stability of Chelex Extractions Stored at Various Temperatures"

Erin Riley
LAPD-SID
555 Ramirez St., Space 270
Los Angeles, CA 90012

DNA isolated from a sample, whether known or questioned, may sometimes need to be stored for an indefinite period of time before amplification and/or detection is performed. This study addressed the question of the integrity of the Chelex

extracted DNA, which was stored at three different temperatures (Room Temp., 4 deg C, and -80 deg C), and stored for various time intervals prior to amplification and detection by HLA DQalpha and D1S80. Each set of extracts was amplified and detected by the two methods above, several times during an eight week period. Each extracted sample gave the same results throughout the entire study. In addition, the same results were achieved at all three storage temperatures used.

"An Examination of Bin Boundary Effects in an RFLP Database by Comparison of Allele Frequencies Using Fixed Versus Floating Bins"

Rob Keister and E. Buse
Orange County Sheriff-Coroner Department
320 N. Flower St.
Santa Ana, CA 92705

Because the bin boundaries for determining RFLP allele frequencies in a fixed bin system are arbitrary with respect to the distribution of the database alleles, there may be chance clustering of alleles near fixed bin boundaries. Selecting the larger frequency of two adjacent fixed bins may underestimate the allele frequency compared to counting the number of database alleles that satisfy a numerical match criteria (a floating bin). This is likely the unstated reason behind the recommendation by the recent National Research Council (NRC) report to always combine adjacent fixed bin allele frequencies when an allele for comparison falls near a bin boundary. This study compares allele frequencies determined by both methods at each rebin boundary using four loci for each of seven racial/ethnic RFLP databases compiled by our laboratory. Out of a total of 477 rebin boundaries examined, there were 32 cases (6.7%) where the floating bin value exceeded the larger of the two adjacent fixed bin values (+/ - 3.4% floating bin width). The largest variation occurred where the floating bin gave a value 1.34 times larger than the greater of the two adjacent fixed bins allele frequencies. The mean ratio of floating bin to fixed bin was 0.59. given the low frequency and small magnitude of this phenomenon, implementing the NRC recommendation in this regard does not seem justified. A more reasoned approach would be to examine alleles in each particular case and only combine adjacent fixed bins when appropriate, or alternatively, use a floating bin system to determine allele frequencies in all cases.

"Isoenzymes of Dental Pulp"

Kathyrn Marks, Patricia Lough and David Stockwell
San Bernardino S.O., S.I.D.
200 S. Lena Rd.
San Bernardino, CA 92415-0056

The isoenzymes of dental pulp were compared to those of reference blood standards using a nonequilibrium isoelectric focusing electrophoresis multisystem. The 20 samples were analyzed for the isoenzymes Esterase D (EsD), Red Cell Acid Phosphatase (AcP1), Phosphoglucomutase (PGM1), Adenylate Kinase (AK), and Adenosine Deaminase (ADA). These 5 enzymes were identified in both the blood standards and the dental pulp samples. A great increase in PGM activity was seen in the dental pulp, requiring a reduction in sample concentration. It was determined that IEF is a suitable method for identifying the genetic markers present in dental pulp.

"The BAR-STO Barrel"

Starr Sachs
LAPD-SID/Firearms
3401 San Fernando Road
Los Angeles, CA 90065

Bar-Sto Precision Machine is a small (eight employees) family-owned company located in Twenty-nine Palms, CA, which produces custom manufactured and fitted barrels for revolvers and semi-automatic pistols of various calibers. None of the products are made by automated methods, but only by hand. Their Products have been received in casework by examiners in the LAPD firearms unit. A video presentation demonstrating the manufacture and precision machining of stainless-steel pistol barrels is presented. The .45 auto is featured in this demo, but other calibers including a .38 revolver are manufactured.

"Application of the Milenia Cocaine Metabolite Kinetic Enzyme Immunoassay to Screening Whole Blood Samples"

Renee Artman, Debra Mittelbrun and Norman Wade
Ventura Co. Sheriff
800 S. Victoria Ave.
Ventura, CA 93009

The objective of this study was to adapt a commercially available kinetic enzyme immunoassay (EIA) to screening whole blood (DUID and post mortem specimens) for cocaine, benzoylecgonine and cocaine metabolites. Calibrators were made by spiking blood bank blood with benzoylecgonine. Sample volume was increased to 50ul. The blank response (mOD/min) for blood bank blood was found to be not significantly different than that for negative post mortem blood or negative ante mortem blood collected on NaF/Oxalate from laboratory volunteers. The blank mean was 206.4 mOD/min, SD=7.4 mOD/min, CV=3.6%. The limit of detection determined as the mean blank response minus 3 SD was 10 ng/ml. From the blood calibration curve a cutoff concentration for positives of 50 ng/ml was selected. The precision at the cutoff was: mean=159.6 mOD/min, SD=4.2, CV=2.6%. The difference between the negative blood reference and the cutoff reference was 46 mOD/min or greater than ten SDs. In another run, interindividual variation for negative specimens collected from 15 individuals was: mean=336 mOD/min, SD=44. There was no overlap at 3 SD with the cutoff response. Forty-six DUID samples were analyzed by RIA (cutoff 100 ng/ml) and by the modified EIA (cutoff 50 ng/ml). The two methods agreed in 14 positive samples and 26 negative samples. Two samples were positive by RIA but negative by the EIA. Four samples were positive by EIA but negative by RIA. Cross-reactivity of the kit for drugs spiked into blood bank blood was benzoylecgonine 100%, Cocaine 153%, ethylcocaine 60%, ecgonine methyl ester not detected at 100,000 ng/ml (ND), benzphetamine 0.11%, procaine 0.02%, lidocaine ND, amitriptyline ND.