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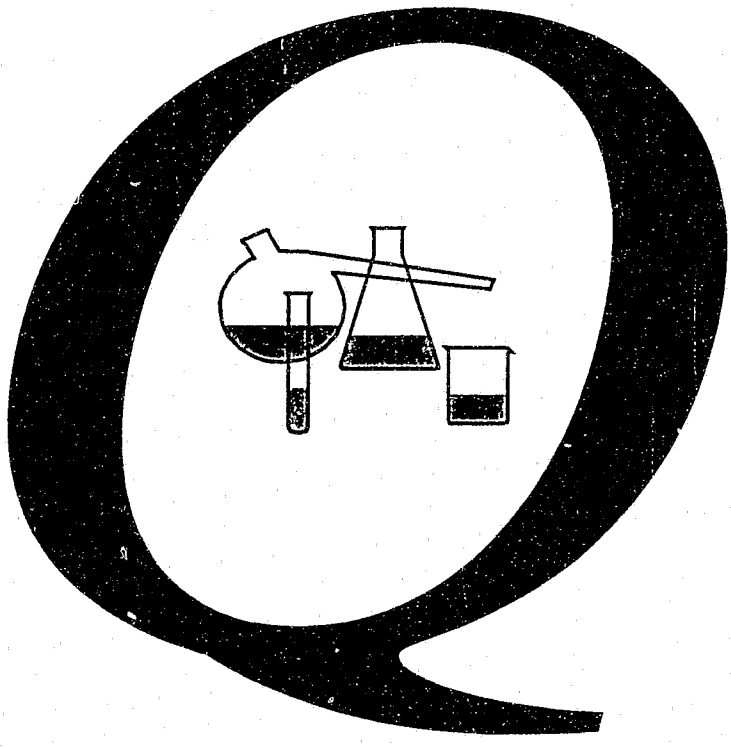
In This Issue:



CRIME LABORATORY DIGEST

PUBLICATION POLICY

The Crime Laboratory Digest is published quarterly by the FBI Laboratory in cooperation with the American Society of Crime Laboratory Directors (ASCLD). It is intended to serve as a rapid means of communication between crime laboratories, permitting information of interest and value to be disseminated among crime laboratory scientists.

Inclusion of an article in the Crime Laboratory Digest in no way represents an endorsement or recommendation of any part of that article by the Federal Government, the Department of Justice or the FBI. Contributing authors assume total responsibility for the contents and accuracy of their submissions. Questions or requests concerning an article should be directed to the contributing agency.

All submissions are subject to editorial review in accordance with the editorial policy established by the FBI Laboratory and ASCLD. The editorial staff of the Crime Laboratory Digest reserves the right to edit all articles for style, grammar and punctuation. Comments and letters to the editor are encouraged and will be published when appropriate and as space permits. These should be forwarded to:

Crime Laboratory Digest - Editor
FSRTC, FBI Academy
Quantico, Virginia 22135

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Message from the Assistant Director in Charge of the FBI Laboratory

This issue's feature article, "A Guide for Conducting a DNA Quality Assurance Audit," is another product of the Technical Working Group on DNA Analysis Methods (TWGDAM). This guide is intended to provide laboratory managers and supervisors with a method to determine how well their laboratories comply with TWGDAM's "Guidelines for a Quality Assurance Program for DNA Analysis," published in the April 1991 issue of the Crime Laboratory Digest (Vol. 18, No. 2, pp. 44–75). It is also intended to help identify the areas of a laboratory's performance which need improvement, and may be used by laboratory managers and supervisors to establish their own audit programs for DNA analysis.

The technical article in this issue describes the results of a collaborative laboratory study on gunshot primer residue (GSR) analysis. Flameless atomic absorption spectrophotometry (AAS) was used on GSR sample collection swabs for the quantitative determination of barium and antimony, which are components of most primer mixtures. Two FBI Laboratory analysts and eight analysts from other law enforcement laboratories participated in the study, which indicated that AAS yields reliable results when the extraction procedure is performed with precision and accuracy. Subsequently, the AAS method has been adopted for use in the FBI Laboratory on all submitted GSR evidence swabs.

TQM in the FBI Laboratory: Since 1991, the FBI Laboratory has been searching for ways to incorporate the concepts of total quality management (TQM) into our long-range plans and day-to-day operations. At the heart of our quest is the need to review the forensic services we offer to identify opportunities to better serve our customers' needs. An initial step was to define a vision statement encapsulating the essence of our role in the law enforcement community, and to emphasize the subtle ways in which our collective values can guide and inspire us toward common goals.

Vision Statement of the FBI Laboratory: The FBI Laboratory will be foremost in the delivery of forensic examinations and other services to law enforcement through:

- A total commitment to quality.
- Prompt, accurate and thorough responses to all requests.
- Technical leadership.
- Innovative uses of technology to facilitate investigations.
- Sharing information and technology with the criminal justice community.
- A work environment which fosters open communication, creativity, individual initiative and personal achievement.

All FBI Laboratory managers and over half of all other employees have completed training in TQM concepts. The FBI Laboratory has established several quality action teams to examine specific, long-standing management issues such as health and safety, professional development, and streamlining and reshaping our work processes. Resolutions in each of these areas will require that we reach a consensus at all levels of the organization by using a team approach to problem solving.

One of the FBI Laboratory's strategic goals is to facilitate information sharing within the law enforcement community. This goal is really part of a broader role we are pursuing of identifying and promoting technical opportunities which can directly benefit law enforcement operations at Federal, state and local levels. Programs such as CODIS and DRUGFIRE enable the FBI Laboratory to share specialized knowledge about DNA testing and firearms examination, respectively, with state and local crime laboratories so that data can be exchanged to link cases and facilitate criminal investigations. The success of each of these programs depends on standards which must be followed by each participating laboratory to allow the exchange of compatible data. The FBI Laboratory's role in

each program is to work with user organizations to identify automation requirements and to deliver software and standard procedures which make data exchange possible.

DNA Identification Act of 1993: On March 29, 1993, the House of Representatives passed the DNA Identification Act of 1993 (H.R. 829) which was introduced by Congressman Don Edwards. The Senate's version of the bill, S. 497, is now before its Judiciary Committee. This same bill passed the House and Senate in 1991 and was included in the conference version of the Crime Bill in December 1991.

The FBI believes that H.R. 829/S. 497 is a good bill for Federal, State and local law enforcement and supports its passage. It would achieve several objectives essential for establishing forensic DNA testing on a national scale.

First, $10 million in grants is authorized each year for 5 years to state and local crime laboratories seeking to develop or improve forensic DNA testing capabilities.

Second, the bill establishes a DNA advisory board to recommend DNA testing standards to the FBI. Standards focus on quality assurance and proficiency testing for DNA laboratories. The advisory board would represent a broad range of scientific perspectives, including forensic science, to insure equitable treatment of technical and policy issues affecting DNA testing for law enforcement purposes.

Finally, H.R. 829/S. 497 formalizes the FBI's authority to operate a national DNA index, permitting states to exchange DNA data from violent crime investigations, especially rape and homicide. A national DNA index would also enable DNA evidence to be matched against state DNA databases of convicted sex offenders to identify suspects in rape cases.

Although DNA testing is one of the most powerful tools currently available for investigating violent crime, it should not be viewed strictly as a law enforcement issue. In cases where a rape victim cannot identify a suspect, DNA presents police and prosecutors with the perpetrator's biological "calling card." As a result, DNA analysis should be viewed as a key component of a national effort to fight violence against women.

In 1991, 106,593 forcible rapes were reported in the United States, an increase of 3.9% from 1990.[1] Of those, 52% were not cleared by arrest. A Bureau of Justice Statistics study of recidivism rates among convicted offenders showed that 60% of violent offenders were rearrested within 3 years, with approximately 40% returning to prison.[2] Released rapists are 10.5 times more likely to be rearrested for rape than other released offenders. In addition, one in eight rearrests was for a crime committed in a different state than the prior offense occurred.

Twenty-two states have already passed laws requiring persons convicted of sex offenses (and often other violent crimes) to contribute DNA samples to be typed and stored in state DNA databases.[3] Several other states are currently considering DNA database legislation. The only effective means for identifying rape suspects in large metropolitan areas, especially those crossing state lines or including multiple police jurisdictions, is a network which allows interstate and inter-jurisdictional comparisons of DNA samples. Undoubtedly, the greatest benefit for states establishing DNA databases will be the increased ability to identify recidivist rapists after their release into society. However, state DNA databases can work effectively only if DNA laboratories are adequately staffed and funded, and if they use standard laboratory procedures so that DNA data can be exchanged within and between states.

John W. Hicks

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[1] *U.S. Department of Justice. Federal Bureau of Investigation (1992).* Crime in the United States, 1991. U.S. Government Printing Office, Washington, D.C.

[2] *U.S. Department of Justice. Bureau of Justice Statistics (1989).* A Survey of Recidivism Among Prisoners Released in 1983. U.S. Government Printing Office, Washington, D.C.

[3] Arizona, California, Colorado, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Missouri, Nevada, Oklahoma, Oregon, South Dakota, Tennessee, Virginia and Washington.

Editor's Column

I would like to express my sincere apology to John Murdock for inadvertently omitting his name from the Editorial Board list in the last issue of the Crime Laboratory Digest. John has been a valued member of our Editorial Board for a number of years in his capacity as a member of the Publications Committee of the American Society of Crime Laboratory Directors. Because of his continued contributions and wise counsel, I have asked John to serve as a permanent member of the Editorial Board, an assignment which he has graciously accepted. If you are not aware, John has recently retired as Chief of the Contra Costa County Sheriff's Office Crime Laboratory in Martinez, California and has taken a position as a Firearms and Toolmark Examiner with the Bureau of Alcohol, Tobacco & Firearms in the San Francisco area. We all wish him well.

We begin 1993 facing budget and staffing cuts, while at the same time responsibilities and demands continuously increase. If any of you have devised innovative methods or procedures to address any of these situations, please share them with our readers by submitting an article for publication. In these austere times, we all are in dire need of any new ideas or possible solutions. Even if you have a short, simple "do more with less" brainstorm, send it in as a letter to the Editor, and we will print it as such for the good of the cause.

EMPLOYMENT OPPORTUNITIES

Crime Laboratory Analyst (Firearms and Toolmark Examiner): The Florida Department of Law Enforcement (FDLE) Regional Crime Laboratory in Tampa is seeking applicants for a Crime Laboratory Analyst (Firearms and Toolmark Examiner). Minimum qualifications include a Bachelor's degree in forensic science, criminalistics, or a physical or natural science, plus 1 year of professional experience in a forensic laboratory, including completion of a training program in the discipline. Salary range: $29,001 – $48,866 per year. Submit resumes to Mike Hall, FDLE, Tampa Regional Crime Laboratory, 4211-A North Lois Avenue, Tampa, Florida 33614-7774 (telephone: 813-878-7301, Ext. 6388). The Florida Department of Law Enforcement is an Equal Opportunity Employer.

Criminalist II (Firearms and Toolmark Examiner): The Broward County Sheriff's Office Crime Laboratory us seeking applicants for a Firearms and Toolmark Examiner. Minimum qualifications include a Bachelor's degree in a physical science, plus 3 years of work experience in firearms and toolmark identification. Position duties include analyzing firearms, toolmarks, clothing for gunshot residues, and serial number restorations in a full range of case work. Candidates must be qualified to render expert witness court testimony and are subject to a polygraph examination, drug testing, medical testing and a background examination. Salary range: $35,786 – $50,343 per year plus benefits. Submit resumes to the Broward County Sheriff's Office, Personnel Division, 2600 Southwest 4th Avenue, Fort Lauderdale, Florida 33315. For further information, contact Dennis Grey (telephone: 305-357-7320). The Broward County Sheriff's Office is an Equal Opportunity Employer.

Firearms/Toolmark Examiner: The Vermont Department of Public Safety Crime Laboratory is seeking applicants for a Firearms/Toolmark Examiner. Minimum qualifications include either of the following: 1) a Bachelor's degree in criminalistics, forensic science, chemistry or a related field; or 2) a high school diploma, plus 4 years of technical analysis work experience in a medical or forensic laboratory. For further information and an application, contact Duncan A. Higgins, Personnel Administrator, Vermont Department of Public Safety, 103 South Main Street, Waterbury, Vermont 05676 (telephone: 802-244-8763). The Vermont Department of Public Safety is an Equal Opportunity Employer.

Forensic Chemist: The Vermont Department of Public Safety Crime Laboratory is seeking applicants for two Forensic Chemists positions. Minimum qualifications include any of the following: 1) a Bachelor's degree with 18 hours in chemistry, plus either 4 years of professional laboratory experience or 2 years of forensic laboratory experience; 2) a Master's degree in a relevant field of chemistry, plus 2 years of professional laboratory experience or 1 year of forensic laboratory experience; or 3) a Ph.D. in chemistry, biochemistry or

physical chemistry, which may be substituted for work experience. For further information and an application, contact Duncan A. Higgins, Personnel Administrator, Vermont Department of Public Safety, 103 South Main Street, Waterbury, Vermont 05676 (telephone: 802-244-8763). The Vermont Department of Public Safety is an Equal Opportunity Employer.

Forensic Drug Analyst III: The New Mexico Department of Public Safety Crime Laboratory is seeking applicants for a Forensic Drug Analyst III. Minimum qualifications include a Bachelor's degree from an accredited college or university in chemistry, biology, pharmacology, forensic science or a physical science, plus 4 years of professional experience in the forensic analysis and identification of suspected controlled substances. Salary range: $13,411 – 28,109 per year. If a fully qualified candidate cannot be employed, the position may be filled as a Forensic Drug Analyst II, with the same educational requirements plus 2 years of professional experience in the forensic analysis and identification of suspected controlled substances. Submit resumes to Thomas E. Van Valkenburgh, New Mexico Department of Public Safety, Crime Laboratory Bureau, P.O. Box 1628, Santa Fe, New Mexico 87504-1628 (telephone: 505-827-9136). The New Mexico Department of Public Safety is an Equal Opportunity Employer.

Forensic Scientist: The Virginia Department of General Services, Consolidated Laboratory Services is seeking applicants for a Forensic Scientist to work in the Norfolk laboratory. Minimum qualifications include a Bachelor's degree in biology, chemistry or a related science, plus professional experience as a forensic serologist and court qualification in the area of forensic examination of blood and body secretions. Experience in the examination of fabric separations and the recovery of hairs and fibers is preferred. Applicants must have knowledge of laboratory safety procedures and QA/QC and be able to 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 and experience in the forensic application of DNA technology is desirable. Applicants must possess a valid driver's license and are subject to a security clearance investigation. Position duties include performing serological analyses of criminal evidence, preparing written reports detailing the results of laboratory examinations, instructing law enforcement personnel on the handling of evidence and testifying in court as an expert witness. Salary range: $25,695 – $39,232 per year. If a fully qualified candidate cannot be employed, a Forensic Scientist Trainee position may be offered to the most suitable candidate at a salary range of $23,505 – $26,274 per year. Submit a state application form (#10-012) to the Department of General Services, 805 East Broad Street, Room 117, Richmond, Virginia 23219 (telephone: 804-786-6152). The Virginia Department of General Services is an Equal Opportunity Employer.

Latent Print Examiner: The Vermont Department of Public Safety Crime Laboratory is seeking applicants for a Latent Print Examiner. Minimum qualifications include either of the following: 1) a Bachelor's degree in criminalistics, forensic science, chemistry or a related field; or 2) a high school diploma, plus 4 years of technical analysis work experience in a medical or forensic laboratory. For further information and an application, contact Duncan A. Higgins, Personnel Administrator, Vermont Department of Public Safety, 103 South Main Street, Waterbury, Vermont 05676 (telephone: 802-244-8763). The Vermont Department of Public Safety is an Equal Opportunity Employer.

Latent Print Examiner II: The city of Phoenix is seeking applicants for a Latent Print Examiner II. Minimum qualifications include an Associates degree or 60 accredited college semester hours in criminalistics or a closely related field, supplemented by formal training in latent fingerprints, photography and police identification techniques. Additional qualifications include 3 years of law enforcement work experience involving both inked and latent fingerprint classification. Candidates must be qualified to testify in court as an expert witness. Salary range: $30,181 – $42,890 per year. Qualified candidates should contact Frank J. Rodgers, Latent Print Section Supervisor, Phoenix Police Department (telephone: 602-262-6197). The city of Phoenix is an Equal Opportunity Employer.

Latent Fingerprint Examiner III: The New Mexico Department of Public Safety Crime Laboratory is seeking applicants for a Latent Fingerprint Examiner III. Minimum qualifications include a Bachelor's degree from an accredited college or university plus 3 years of professional experience in latent fingerprint identification, or a combination of education and experience totaling 6 years.

Additional requirements include completion of the FBI Academy's "Advanced Latent Fingerprint Identification" and "Advanced Administration of Latent Fingerprint Identification" courses and IAI certification. Salary range: $13,411 – 28,109 per year. Submit resumes to Thomas E. Van Valkenburgh, New Mexico Department of Public Safety, Crime Laboratory Bureau, P.O. Box 1628, Santa Fe, New Mexico 87504-1628 (telephone: 505-827-9136). The New Mexico Department of Public Safety is an Equal Opportunity Employer.

FORENSIC SPECIALISTS TO VISIT RUSSIA AND HUNGARY

A delegation of forensic specialists has been invited to visit Moscow, Russia and Budapest, Hungary in September 1993. Dr. Ilya Zeldes, Director of the South Dakota State Forensic Laboratory, is coordinating the trip. The delegation will include law enforcement officers, criminalists and other professionals in the field of forensics. Dr. Zeldes organized and led a delegation of forensic experts to Moscow in 1990 and hopes to expand and repeat the success of the first visit.

This year, a group of approximately 15 delegates and their spouses is being assembled for the trip, which is scheduled for September 14-25, 1993. The visit will serve as a goodwill mission and an opportunity for delegates to participate in a technical and cultural exchange with Russian and Hungarian professional counterparts.

The program will focus on forensic sciences and practice as it pertains to criminal and civil investigations, court proceedings, law enforcement, education and research. Participants will take part in a series of briefings, meetings, group discussions, seminars and field visits. Numerous extracurricular activities and social events are also planned.

The Center for International Projects, a non-profit organization headquartered in Moscow, is coordinating this project. For further information, please contact Robin B. Dean, Director, Center for International Projects, 600 Bypass Drive, Suite 109, Clearwater, Florida 34624 (telephone: 813-799-3903).

AMERICAN BOARD OF FORENSIC HANDWRITING ANALYSTS

The American Board of Forensic Handwriting Analysts, Inc. has been formed. This professional society is a non-profit organization of individuals having an interest in behavioral profiling based on handwriting analysis and/or an interest in questioned document examinations. The purpose of this new organization is both scientific and educational in nature. The Board currently has training programs in behavioral profiling and forensic document examination, and it publishes a newsletter for members.

There are presently 200 members, and membership is increasing rapidly. Current members include neurologists, psychiatrists, clinical psychologists, police officers, investigators, private security personnel, forensic handwriting analysts, questioned document examiners and other laboratory personnel. There are three different categories of membership and fees:

Board Certified Members: $110
Candidate for Board Certification: $100
Associate Member: $75

The first national meeting will be held from August 6-9, 1993. For further information, contact:

American Board of Forensic Handwriting Analysts, Inc.
P.O. Box 1648
Branson, Missouri 65616
(telephone: 417-334-6411, Ext. 4392 – Days)
(telephone: 417-335-4787 – Evenings)

ASCLD 20TH ANNIVERSARY PUBLICATION

The American Society of Crime Laboratory Directors (ASCLD) will celebrate its 20th anniversary in 1994. To celebrate, ASCLD is compiling a history of the organization for publication in early 1995.

To trace the history of ASCLD, the assistance of all laboratories is requested. The anniversary publication will be sent to all ASCLD members and to those laboratories which submit material. Our goal is to produce a written and pictorial history of the development of crime laboratories. Answers to questions such as the following are requested: When (date) was your laboratory started? Where was it housed? What equipment did it have? By whom was it staffed? What analyses did they perform? How was the laboratory funded? What was the chain of command? How has it changed and developed? Anecdotes are welcome.

Pictures of the 'old days' are especially requested, of both laboratories and staff members.

Submissions of pictures and documents will be returned, if requested. If not, submitted material will be placed in the ASCLD archives.

All information for inclusion in the ASCLD anniversary publication must be submitted by February 1994. Please forward all materials to:

Carla Noziglia
Director, Laboratory Services
Las Vegas Metropolitan Police Department
6761 West Charleston Boulevard
Las Vegas, Nevada 89102-9003
(telephone: 702-229-3932)
(FAX: 702-229-3948)

FBI SYMPOSIUM PROCEEDINGS

The following proceedings of international symposia hosted by the FBI Laboratory are currently available from the National Technical Information Service:

Proceedings of the International Symposium on the Analysis and Detection of Explosives, order number PB88-248562, price $45.00 ($8.00 microfiche) plus $3.00 shipping and handling.

Proceedings of a Forensic Science Symposium on the Analysis of Sexual Assault Evidence, order number PB88-248646, price $23.00 ($8.00 microfiche) plus $3.00 shipping and handling.

Proceedings of the International Symposium on the Forensic Applications of Electrophoresis, order number PB89-185631, price $23.00 ($8.00 microfiche) plus $3.00 shipping and handling.

Proceedings of the International Symposium on the Analysis and Identification of Polymers, order number PB89-185680, price $23.00 ($8.00 microfiche) plus $3.00 shipping and handling.

Proceedings of the International Symposium on Forensic Hair Comparisons, order number PB89-185672, price $31.00 ($8.00 microfiche) plus $3.00 shipping and handling.

Proceedings of the International Symposium on Questioned Documents, order number PB89-185698, price $23.00 ($8.00 microfiche) plus $3.00 shipping and handling.

Proceedings of the International Forensic Symposium on Latent Prints, order number PB89-185714, price: $23.00 ($8.00 microfiche) plus $3.00 shipping and handling.

Proceedings of the International Symposium on Driving Under the Influence of Alcohol and/or Drugs, order number PB90-215831, price $23.00 ($8.00 microfiche) plus $3.00 shipping and handling.

Proceedings of the International Symposium on the Forensic Applications of Digital Image Processing, order number PB90-218751, price $23.00 ($8.00 microfiche) plus $3.00 shipping and handling.

Proceedings of the International Symposium on Forensic Immunology, order number PB90-218769, price $23.00 ($11.00 microfiche) plus $3.00 shipping and handling.

Proceedings of the International Symposium on the Forensic Aspects of Controlled Substances, order number PB90-199472, price $31.00 ($11.00 microfiche) plus $3.00 shipping and handling.

To obtain copies of these publications, inquires should be directed to:

U. S. Department of Commerce
National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161
(telephone: 703-487-4650)

PHOTOGRAPHY OF LATENT FINGERPRINTS BIBLIOGRAPHY

A selected bibliography on *Photography of Latent Fingerprints* has been compiled by Mitchell L. Hollars, Timothy A. Trozzi and the Forensic Science Information Resource System (FSIRS) library staff. Permission has been granted by the publishers to disseminate copies of the documents cited in the bibliography. This service is provided for all duly authorized crime laboratories. To obtain copies of the documents, forward a written request to the following address. Supplies are limited, and all requests must be received by November 1, 1993.

FSIRS Librarian
Federal Bureau of Investigation
Room 3790
10th and Pennsylvania Avenue, N. W.
Washington, D. C. 20535

Technical Article

Flameless Atomic Absorption Spectrophotometric Determination of Antimony and Barium in Gunshot Residue Collection Swabs: A Collaborative Study

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Quantico, Virginia 22135

Law enforcement laboratory analysts frequently determine the amounts of barium (Ba) and antimony (Sb) recovered from the hands to associate an individual with the handling or discharge of a firearm. Barium and antimony, components of most primer mixtures, may be deposited on nearby surfaces during discharge of a firearm or transferred to hands and other surfaces by touching a previously discharged firearm or ammunition component. Samples for this test are obtained by swabbing specified areas of a suspect's hands with cotton-tipped swabs moistened with dilute nitric acid. Methods which have gained widespread judicial acceptance for quantitative determination of Ba and Sb on sample collection swabs include neutron activation analysis (NAA) and flameless atomic absorption spectrophotometry (AAS) (Kilty 1986; Kinard and Lundy 1975). Flameless AAS offers advantages over NAA to most forensic laboratories in its excellent sensitivity for Ba and Sb, ready availability, ease of use, and its applicability to other elements, particularly lead.

An extraction and analysis procedure using graphite furnace AAS for gunshot primer residue (GSR) sample collection swabs was developed in the FBI Laboratory. Variables pertaining to extraction and analysis were optimized, and the effects of altering these conditions have been reported (Koons *et al.* 1987; 1989). The procedure developed in these studies has been taught to analysts in forensic laboratories throughout the United States and is now widely used. In an effort to assess the reliability of the extraction and analysis procedure, analysts from eight laboratories agreed to participate in a collaborative study. The results of that study and an intralaboratory study involving two analysts within the FBI Laboratory are reported in this paper.

COLLABORATIVE STUDY DETAILS

Each sample in this study consisted of two cotton-tipped swabs onto which solutions of Ba and Sb had been placed. Samples were contained in plastic snap-topped tubes, similar to those provided in commercially available GSR collection kits. All solutions used for spiking swabs were made by dilution of spectrophotometric standard solutions, SRM 3102 and 3104, provided and certified as to their accuracy by the National Institute of Standards and Technology. Each set of swabs contained both Ba and Sb spikes. The amounts of Ba and Sb placed on the swabs were selected to span the concentration ranges applicable to the analytical procedure and to test for any interelement effects, such as errors produced in determination of one element in the presence of high levels of the other element. Duplicate sets of samples were provided for the interlaboratory study. Two practice samples were included with the blind samples to assist collaborators in setting up the procedures in their laboratories. Prior to participation in the interlaboratory study, the collaborators attended a 1-week training course in the use of the tested procedure. They then received the test samples and returned to their laboratories to perform the analyses. Two of the analysts were from the same laboratory, making a total of nine collaborators from eight participating laboratories. Results were reported over a 6-month period following preparation of the test samples.

The intralaboratory study was undertaken by two analysts in the FBI Laboratory. The author performed the extraction and analyses at the FBI's Forensic Science Research and Training Center in Quantico, Virginia, and Pamela S. Rebbert performed the extraction and analysis at the FBI

Laboratory in Washington, D.C. In this study, single sets of swabs were analyzed at each location at irregular intervals over a 16-month period.

Copies of the specific procedure to be used for extraction and general suggestions for instrumental setup were provided to each collaborator. Each collaborator was instructed to follow the extraction procedure exactly so as to provide a test of the reliability of the procedure. Due to its length, the entire procedure is not described here. The following is a synopsis: Ba and Sb are extracted from GSR collection swabs by heating to 80° C with 10% HNO_3 for 2 hours. Extract solutions are diluted appropriately and analyzed by flameless AAS by comparison to standards extracted from swabs in the same manner as the samples. Copies of the detailed procedure are available from the author.

RESULTS AND DISCUSSION

The results of the intralaboratory study are shown in Table 1. The overall uncertainty expressed as relative standard deviation (RSD) is 5% to 10% for Ba and Sb at all spike levels. The results presented in Table 1 are shown in order of acquisition over a 16-month period. The close agreement between all results indicates that sample storage time up to 16 months has no effect on precision or accuracy. Also, there are no obvious biases between the results of the two analysts despite their performing the analysis at two different locations. The intralaboratory results are within accuracy and precision criteria needed for interpretation of GSR swab analysis results.

The results of the interlaboratory study are shown in Table 2. The reported Ba values from collaborator #8 were consistently lower than the others. This analyst reported unusually high levels of Ba contamination in blank measurements and standards, possibly resulting in an overcorrection for the Ba blank. Therefore, results from collaborator #8 were excluded from summary calculations for Ba. No other results were excluded from the calculation of summary statistics. Both repeatability and reproducibility were calculated according to the two-way ANOVA procedure recommended by the Association of Official Analytical Chemists (Wernimont 1985) and are shown in Table 2. The repeatability, a measure of the daily within-laboratory precision, is in the 5% to 10% range, except for the highest Ba levels (6.10 µg) for which repeatability is 16%. The reproducibility, a measure of deviation among the nine participating collaborators, is about 20% of the mean for Ba and 10% of the mean for Sb. Some portion of the reproducibility terms probably reflect instrumental differences among laboratories. For example, not all collaborators used instruments with tungsten background correction lamps for Ba determinations. The interlaboratory reproducibility shown in Table 2, with the exception of Ba results for sample #4, is within the limits needed to interpret the forensic significance of GSR swab samples.

The interlaboratory results for Ba in sample #4, which contained 6.10 µg of Ba, exhibit unusually high scatter and a negative bias. At least one collaborator (#1) reported deviation in the tested procedure (substituting deionized water for the blank solution in making dilutions) to accommodate the high dilutions required for this sample. It has been shown that such deviations from the reference procedure produce negative errors in the calculated Ba results (Koons *et al.* 1987). Other collaborators may have made similar undocumented deviations from the tested procedure. In comparison, the lack of bias in the intralaboratory results demonstrates that accuracy and precision at this Ba level are acceptable when following the tested procedure. It is important to note that the Ba level for sample #4 was selected to test the highest concentration range of the analytical procedure and to look for interelement effects, although amounts of Ba higher than about 5 µg are extremely rare in actual GSR collection swabs. Also, when very high levels of Ba are present on hand swabs, they are generally attributed to "dirty" hands rather than the presence of GSR. Thus, negative biases associated with very high concentrations of Ba of the magnitude shown in Table 2 should not pose a serious problem in application of the tested procedure to GSR swab examination.

There are no indications of errors in the determination of either element caused by the presence of high levels of the other element in the intralaboratory or interlaboratory studies. The greatest variations in the intralaboratory results are for sample #5, which contains moderate levels of both elements. Ba determination in sample #4 presented the most difficulty in the interlaboratory study, yet this sample contained relatively low levels of Sb.

CONCLUSIONS

This study was undertaken to assess the reliability of one specific extraction and analysis procedure for determination of Ba and Sb levels in

Table 1. Intralaboratory Collaborative Study Results (μg/pair of swabs) for Determination of Ba and Sb in Gunshot Primer Residue Collection Swabs by Atomic Absorption Spectrophotometry

Collaborator	Ba #1	Ba #2	Ba #3	Ba #4	Ba #5	Sb #1	Sb #2	Sb #3	Sb #4	Sb #5
RDK	0.294	0.533	0.637	6.20	2.63	0.109	0.053	1.44	0.143	0.531
PAR	0.25	0.51	0.58	6.40	2.70	0.112	0.056	1.58	0.145	0.509
PAR	0.30	0.51	0.61	5.90	2.68	0.105	0.061	1.36	0.136	0.49
RDK	0.277	0.515	0.593	6.14	2.67	0.103	0.050	1.36	0.120	0.496
PAR	0.327	0.609	0.665	6.56	2.98	0.123	0.060	1.51	0.162	0.547
RDK	0.239	0.517	0.656	6.13	1.96	0.109	0.057	1.48	0.138	0.619
PAR	0.280	0.535	0.639	6.01	2.65	0.117	0.054	1.51	0.156	0.503
PAR	0.327	0.550	0.632	6.30	2.78	0.111	0.060	1.44	0.147	0.492
RDK	0.263	0.542	0.668	6.11	2.78	0.103	0.058	1.37	0.132	0.469
True Value	0.275	0.530	0.620	6.10	2.73	0.115	0.060	1.38	0.140	0.500
Mean	0.284	0.536	0.631	6.19	2.65	0.110	0.057	1.45	0.142	0.517
Standard Deviation	0.031	0.031	0.031	0.20	0.28	0.007	0.004	0.08	0.013	0.045
RSD, %	11.0	5.8	4.9	3.2	10.5	6.0	6.5	5.3	8.9	8.6
Error	+0.009	+0.006	+0.011	+0.09	-0.08	-0.005	-0.003	+0.07	+0.002	+0.017

Table 2. Interlaboratory Collaborative Study Results (μg/pair of swabs) for Determination of Ba and Sb in Gunshot Primer Residue Collection Swabs by Atomic Absorption Spectrophotometry

Collaborator	Ba #1	Ba #2	Ba #3	Ba #4	Ba #5	Sb #1	Sb #2	Sb #3	Sb #4	Sb #5
1	0.321	0.554	0.641	4.98	2.84	0.116	0.062	1.57	0.157	0.555
	0.314	0.570	0.674	4.10	2.93	0.123	0.065	1.56	0.155	0.548
2	0.324	0.564	0.626	3.97	2.64	0.119	0.064	1.66	0.158	0.461
	0.352	0.640	0.825	4.41	2.62	0.122	0.061	1.47	0.151	0.510
3	0.20	0.30	0.35	4.90	3.10	0.10	0.06	1.40	0.13	0.50
	0.20	0.34	0.36	3.80	3.40	0.12	0.07	1.40	0.14	0.50
4	0.242	0.502	0.569	4.61	3.23	0.11	0.06	1.20	0.13	0.51
	0.314	0.494	0.624	5.92	3.49	0.11	0.06	1.25	0.13	0.51
5	0.250	0.574	0.574	4.04	2.71	0.131	0.059	2.00	0.170	0.586
	0.23	0.50	0.57	3.95	2.63	0.136	0.058	1.92	0.164	0.592
6	0.256	0.528	0.660	4.70	2.14	0.100	0.046	1.36	0.131	0.463
	0.263	0.524	0.694	4.12	2.22	0.090	0.050	1.50	0.135	0.487
7	0.304	0.618	0.673	5.40	2.61	0.128	0.069	1.74	0.157	0.572
	0.253	0.575	0.723	7.68	3.52	0.115	0.062	1.84	0.151	0.451
8	0.000[1]	0.304[1]	0.573[1]	3.36[1]	2.54[1]	0.100	0.055	1.43	0.147	0.488
	0.000[1]	0.366[1]	0.508[1]	3.63[1]	2.76[1]	0.119	0.061	1.62	0.150	0.566
9	0.255	0.468	0.543	5.43	2.53	0.105	0.059	1.24	0.128	0.523
	0.228	0.433	0.516	4.98	2.56	0.106	0.059	1.33	0.144	0.477
True Value	0.275	0.530	0.620	6.10	2.73	0.115	0.060	1.38	0.140	0.500
Mean	0.269	0.512	0.601	4.81	2.82	0.114	0.060	1.53	0.146	0.517
Repeatability										
S_r	0.025	0.031	0.055	0.78	0.25	0.008	0.003	0.08	0.005	0.038
RSD_r, %	9.2	6.2	9.1	16.1	8.9	6.9	5.8	5.3	3.6	7.3
Reproducibility										
S_R	0.048	0.095	0.126	1.00	0.43	0.012	0.006	0.24	0.013	0.044
RSD_R, %	17.7	18.5	20.9	20.7	15.3	10.9	9.8	15.7	9.2	8.6

[1] Barium results from laboratory #8 consistently lower than others, dropped from summary calculations.

GSR collection swabs. The intralaboratory study within the FBI Laboratory indicates that the tested procedure yields results with accuracy and precision comparable to that which has been obtained by NAA for many years. As a result, the AAS method has been adopted for use in the FBI Laboratory on all submitted GSR swab evidence kits. Results of the interlaboratory portion of this study show that the accuracy and precision achieved using the tested procedure in various settings with analysts of diverse backgrounds and levels of training is generally suitable for proper interpretation of GSR swab data. One laboratory experienced errors in Ba determination due to contamination of its reagent solutions. This error was known at the time of analysis and has since been corrected. The method used in this study may be used directly, or as a method by which to compare in-house methods of GSR extraction and analysis.

ACKNOWLEDGMENTS

The assistance of Pamela A. Rebbert as an intralaboratory collaborator and the following collaborating laboratories is appreciated:

1. FBI Laboratory, Washington, D.C.
2. Tarrant County Medical Examiner, Fort Worth, Texas.
3. Wyoming State Crime Laboratory, Cheyenne, Wyoming.
4. Albuquerque Police Department, Albuquerque, New Mexico.
5. San Bernardino County Sheriff's Department, San Bernardino, California.
6. North Carolina State Bureau of Investigations, Raleigh, North Carolina.
7. Orange County Sheriff-Coroner's Department, Santa Ana, California.
8. Iowa Division of Criminal Investigation, Des Moines, Iowa.

REFERENCES

Kilty, J. W. (1986). A review of the FBI Laboratory's gunshot primer residue program, Crime Lab. Digest 13:54-61.

Kinard, W. D. and Lundy, D. R. (1975). A Comparison of Neutron Activation Analysis and Atomic Absorption Spectroscopy on Gunshot Residue. In: Forensic Science. Edited by G. Davies. American Chemical Society Symposium Series No. 13, Washington, D.C., pp. 97-107.

Koons, R. D., Havekost, D. G. and Peters, C. A. (1989). Analysis of gunshot primer residue collection swabs using flameless atomic absorption spectrophotometry and inductively coupled plasma-atomic emission spectrometry: effects of a modified extraction procedure and storage of standards, J. Forensic Sci. 34:218-221.

Koons, R. D., Havekost, D. G. and Peters, C. A. (1987). Analysis of gunshot primer residue collection swabs using flameless atomic absorption spectrophotometry: a reexamination of extraction and instrument procedures, J. Forensic Sci. 32:846-865.

Wernimont, G. T. (1985). Use of Statistics to Develop and Evaluate Analytical Methods. Edited by W. Spendley. Association of Official Analytical Chemists, Arlington, Virginia, pp. 112-122.

Notes from the Technical Working Group on DNA Analysis Methods

The Technical Working Group On DNA Analysis Methods (TWGDAM) was formed to address the development and implementation of the restriction fragment length polymorphism (RFLP) analyses in public crime laboratories of North America. Throughout the years of its existence, this group has met with considerable success in the coordination, conduct and reporting of experimental studies supporting the RFLP analysis. In addition, TWGDAM members have published guidelines appropriate to the conduct of the RFLP and polymerase chain reaction (PCR) tests for use by the crime laboratory community.

As new methodologies and techniques arise from the fields of molecular biology and population genetics, it has been considered a responsibility of TWGDAM to examine these advances for their potential to enhance existing procedures or to open new routes to the genetic typing of biological evidence. During the February 1993 meeting of the TWGDAM, representatives of participating laboratories were organized into several working groups. Each working group was tasked with examining emerging issues and developments pertinent to a specific area of DNA typing. Groups were designated to study the following areas: (1) enhancements to RFLP analysis, (2) additional guidelines for quality assurance (QA) and quality control (QC) of DNA analyses, (3) new approaches to using the PCR, and (4) methods for the typing of mitochondrial DNA. During its inaugural meeting, each working group developed a mission statement and an initial study agenda. A summary of each group's effort follows:

RFLP WORKING GROUP

I. Mission Statement

To coordinate the acquisition and pooling of existent data relating to the conduct of RFLP techniques, to coordinate the design of additional studies if required, and to disseminate information derived from these endeavors to the forensic community.

II. Members and Laboratory Affiliations

Samuel Baechtel – FBI (Group Chair)
John Bowen – Royal Canadian Mounted Police
John Brown – FBI
Eric Buel – Vermont State Police
Harold Deadman – FBI
Thomas Grant – Missouri State Police
Teresa Gronert – Maryland State Police
Berch Henry – Washoe County (Nevada) Sheriff's Office
Stephen Lambert – South Carolina Division of Law Enforcement
Jenifer Lindsey – FBI
Donald MacLaren – Washington State Patrol
Mark Nelson – North Carolina State Bureau of Investigation
James Pollock – Florida Department of Law Enforcement
Clement Smetana – U.S. Army Criminal Identification Lab
Scott Wanlass – Nassau County (New York) Police

III. Summary of Meeting

Suggestions were offered by members of the group concerning areas of the RFLP procedure that could be enhanced. These areas were placed in order of priority, and an information manager was assigned to each. It will be the responsibility of the information manager to assemble pre-existing data in the priority areas to bring to the group's attention.

The areas upon which this group will focus and the appropriate information managers are listed as follows:

A. Validation of additional RFLP loci – Thomas Grant
B. RFLP analysis by chemiluminescence – Clem Smetana
C. Sizing of alleles in the upper and lower gel regions – Eric Buel
D. Acquisition of DNA from solid tissues – Samuel Baechtel
E. DNA indigestibility difficulties – James Pollock
F. Standard procedures for interpretation of RFLP pattern oddities – Harold Deadman
G. Use of monomorphic/Y-specific probes – Mark Nelson
H. Statistical procedures for criminal paternity/maternity – John Bowen

A survey was conducted of all TWGDAM representatives to determine what information or data exists among this group which is pertinent to the areas listed above. The RFLP working group will meet at the next scheduled TWGDAM meeting in July to evaluate its findings.

QA/QC WORKING GROUP

I. Mission Statement

The promulgation of quality assurance guidelines for laboratories implementing and supporting forensic DNA analysis techniques.

II. Members and Laboratory Affiliations

James Mudd – FBI (Group Chair)
Dennis Reeder – National Institutes of Standards and Technology
Lucy Davis – Kentucky State Police
Susan Narveson – Arizona Department of Public Safety
Ken Konzak – California Department of Justice
Scott Wanlass – Nassau County (New York) Police
Mark Nelson – North Carolina State Bureau of Investigation
Cecilia VonBeroldingen – Oregon State Police
Rhonda Roby – Armed Forces Institute of Pathology
Jack Mertens – FBI
Eric Buel – Vermont State Police
John Bowen – Royal Canadian Mounted Police

III. Summary of Meeting

The QA/QC Working Group will be compiling and reviewing currently available information on guidelines for the following subjects:

A. Manufacturers of DNA proficiency tests.
B. DNA Case interpretation.
C. DNA training.
D. QA/QC for emerging DNA analysis methods.

All of the information collected in each of these topic areas will be circulated to QA/QC working group members in preparation for addressing these issues at the July 1993 TWGDAM meeting.

PCR WORKING GROUP

I. Missions

A. Identify PCR based marker systems for testing.
B. Transfer technology to the PCR Working Group.
C. Design validation study criteria.
D. Undertake validation studies.
E. Develop criteria to share population and validation data.

II. Members and Laboratory Affiliations

Bruce Budowle – FBI (Group Chair)
Ronald Fourney – Royal Canadian Mounted Police
George Herrin – Georgia Bureau of Investigation
Sue Rogers – Alabama Department of Forensic Science
George Duncan – Broward County (Florida) Sheriff's Office
Pam Fish – Chicago Police Department
John Hartmann – Orange County (California) Sheriff-Coroner's Department
Roger Kahn – Metro-Dade Police Department
Marcia Eisenberg – Roche Biomedical Laboratories
George Sensabaugh – University of California at Berkeley
Pam Newell – Toronto Centre for Forensic Science
Jeffrey Ban – Virginia Forensic Science Division
Terry Laber – Minnesota Bureau of Criminal Apprehension
Lawrence Presley – FBI
Elizabeth Benzinger – Illinois State Police
Charles Barna – Michigan State Police
Elaine Pagliaro – Connecticut Department of Public Safety
Rebecca Reynolds – Roche Molecular Systems
Arthur Eisenberg – Texas College of Osteopathic Medicine

III. Outline of Topics Discussed

A. Markers available for evaluation.

DQ-Alpha, POLYMARKER
D1S80 (AMPFLP)
STR based markers

B. Topics for evaluation.

Sample preparation
Ladders, controls
Kits
Automation
Equipment
Validation studies, population studies
Interpretation (*ie.*, shadow bands)

C. Thermocyclers.

Polling the laboratories, three generations of Perkin-Elmer thermocyclers (TC1, 480, 9600) were represented.

D. Study structure.

Two markers were selected to begin evaluation: D1S80 and Polymarker.

The group will be divided into two groups to study the markers. If a laboratory so desired, it could participate in the evaluation of both.

MITOCHONDRIAL DNA WORKING GROUP

I. Mission Statement

To establish mtDNA sequence as an acceptable means of forensic identification. Within the framework of previously instituted TWGDAM guidelines, create technical guidelines for mtDNA laboratory procedures and sequence analysis.

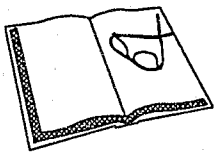
II. Members and Laboratory Affiliations

Joseph DiZinno – FBI (Group Chair)
Mark Stoneking – Pennsylvania State University
Mitchell Holland – Armed Forces Institute of Pathology (AFIP)
Deborah Fisher – AFIP, (Recording Secretary)
Mark Wilson – FBI

III. Summary of Meeting

The group decided to focus on the following areas:

A. To establish mtDNA sequence analysis as a routine method of forensic identification.
B. Within the framework of established TWGDAM guidelines, formulate guidelines specific to sequencing and mtDNA typing.
C. Assemble a mtDNA database of Caucasian, African and Asian populations.
D. Perform specific validation experiments along TWGDAM guidelines.



Book Review

Introduction to Handwriting Examination and Identification
by Russell R. Bradford and Ralph B. Bradford. Nelson-Hall Publishers, Chicago, Illinois, 1992, 488 pages.

Russell R. Bradford advises that much of text in this book is based upon a book begun by his father, Ralph B. Bradford, who died in 1971. Both men had lengthy careers as document and fingerprint examiners with the Long Beach, California, Police Department. Russell Bradford attributes his inspiration and much of the book's content to his father. It is based in part upon courses taught by the senior Bradford to investigators in the western United States between 1957 and 1968.

In their double preface, each author describes his intention to provide a book for investigators to help them better understand the fundamentals of handwriting examinations and to improve their job skills and performance. These intentions are fulfilled. Investigators and document examiners in law enforcement laboratories will find the chapter on "The Bradford System" of particular value in clearly and thoroughly describing how to set up an easy-to-search fraudulent check file.

Although the authors make it clear that the book is not intended as a comprehensive text for the training of document examiners, those professionals will find it interesting and informative. Of particular interest to them is the lengthy first chapter devoted to the history of document examination, narrations of numerous historical documents-related cases and the American pioneers of the profession who conducted the examinations in those cases. The author(s) also provide brief biographical sketches of several of those examiners for inclusion in their "Document Examiner Hall of Fame" and an excellent and well-researched history of typewriters.

It is important to note that the book's title is somewhat misleading. Although purporting to deal with handwriting examinations and identification, the authors devote 150 of its 488 pages to non-handwriting topics such as typewriters and check protectors, fingerprint identification and the roles of document and fingerprint examiners as expert witnesses in courts. That space is well-utilized, however, since those related topics are also integral to documents as physical evidence.

This book is very well written. It is fully researched and annotated, and it contains numerous case examples with a profusion of related photographs and other illustrations. Practical in its approach, this book is a valuable reference source for investigators, forensic document experts and the legal profession.

Reviewed by: James E. Lile
Document Section
FBI Laboratory

Meeting Announcements

REGIONAL FORENSIC SCIENCE ASSOCIATION MEETINGS

The Southern Association of Forensic Scientists (SAFS) will hold its Fall 1993 Meeting at the Omni Hotel in Charleston, South Carolina from September 6-9, 1993.

For further information, contact Earl Wells or Carlotta Stackhouse, South Carolina Law Enforcement Division, 4416 Broad River Road, Columbia, South Carolina 29210 (telephone: 803-896-7300).

The Midwestern Association of Forensic Scientists (MAFS) will hold its 22nd Annual Fall Meeting at the Holiday Inn Southeast in Madison, Wisconsin from October 9-14, 1993.

For further information, contact Michael A. Haas, State Crime Laboratory – Wausau, 7100 Stewart Avenue, Wausau, Wisconsin 54401 (telephone: 715-845-8626 or FAX: 715-848-5833).

The Northeastern Association of Forensic Scientists (NEAFS) will hold its 19th Annual Meeting at the Springfield Marriott in Springfield, Massachusetts from October 14-16, 1993.

The American Board of Criminalistics (ABC) General Knowledge Examination will be offered in conjunction with this meeting at 9:00 AM on October 14.

For further information, contact Karolyn M. Leclaire, Massachusetts Department of State Police Crime Laboratory, 1010 Commonwealth Avenue, Boston, Massachusetts 02215 (telephone: 617-566-4500, Ext. 241 or FAX: 617-566-2833).

The Northwest Association of Forensic Scientists (NWAFS) will hold its Fall 1993 Seminar at the Owyhee Plaza Hotel in Boise, Idaho from October 19-22, 1993.

Technical papers and/or poster board exhibits are requested for presentation at this seminar. Submit papers and/or posters by September 1, 1993 to Rocky Mink or Steve Taormina, Oregon State Police Crime Laboratory, 321 Goodfellow, P.O. Box 1000, Ontario, Oregon 97914 (telephone: 503-889-3831 or FAX: 503-889-2167).

For further seminar information, contact Rick Groff or Donna J. Shepherdson, Bureau of Forensic Sciences, 2220 Old Penitentiary Road, Boise, Idaho 83712 (telephone: 208-334-2231 or FAX: 208-334-2173).

The Midwestern Association of Forensic Scientists (MAFS) will hold its 23rd Annual Fall Meeting at the Cleveland South Hilton Inn in Cleveland, Ohio from October 11-16, 1994.

For further information, contact Mary Wenderoth or Cathy Denissoff, Cleveland Police Department, 1300 Ontario Street, Cleveland, Ohio 44113 (telephone: 216-623-5646 or 216-623-5648).

NATIONAL FORENSIC SCIENCE ASSOCIATION MEETINGS

The first Annual Meeting of the American Board of Forensic Handwriting Analysts will be held in Branson, Missouri from August 6-9, 1993.

The meeting agenda will include presentations on the scientific foundation of forensic handwriting analysis and examination, the chemistry of handwriting, the physiology of the hand, police investigative uses of handwriting analysis, detection of deception/dishonesty in handwriting, microscopic and photographic procedures, and methods/procedures for behavioral profiling. The registration fee is $395.

For further information, contact the American Board of Forensic Handwriting Analysts, Inc., P.O. Box 1648, Branson, Missouri 65616 (telephone: 417-334-6411, Ext. 4392).

The 40th Anniversary and Annual Meeting of the Canadian Society of Forensic Science (CSFS) will be held in Winnipeg, Manitoba, Canada from September 8-12, 1993.

For further information, contact Ron Hyrnchuk, c/o RCMP Forensic Laboratory, 621 Academy Road, Winnipeg, Manitoba, Canada R3N 0E7 (telephone: 204-983-6399).

The 20th Annual Conference of the Federation of Analytical Chemistry and Spectroscopy Societies (FACSS) will be held at the Cobo Hall Convention Center in Detroit, Michigan from October 17-22, 1993.

The meeting agenda will include presentations of technical papers, workshops and an extensive instrument exhibit.

For further information, contact the FACSS Program Chairperson Julian Tyson, University of Massachusetts (telephone: 413-545-1095).

The Canadian Society of Forensic Science (CSFS) and the Northwest Association of Forensic Scientists (NWAFS) will hold a joint meeting at the Waterfront Hotel in Vancouver, British Columbia from October 31 - November 5, 1994.

For further information, contact Jeffrey Caughlin, RCMP Forensic Laboratory, 5201 Heather Street, Vancouver, British Columbia V5Z 3L7 (telephone: 604-264-3507 or FAX: 604-264-3499).

INTERNATIONAL FORENSIC SCIENCE ASSOCIATION MEETINGS

The 15th Congress of the International Society for Forensic Haemogenetics will be held at the Palazzo del Cinema in Venice Lido, Italy from October 13-15, 1993.

For further information, contact Professor U. Rossi, Via Vigoni 5, 20122 Milano (FAX: 0039-331-543639) or the Congress Organizing Secretary, SIITS-AICT Servizi, Viale Brianza 6, 20127 Milano (telephone: 0039-226-148759 or FAX: 0039-226-145813).

Instructions for Submitting Articles

In order to facilitate rapid publication, submissions should conform to the following:

1. Manuscripts should be typed, double-spaced, on 8 1/2" x 11" paper. Submit three copies of the manuscript (one of which must be the original with glossy photographs).

2. Tables should be as simple as possible. Each table should be typed on a separate sheet of paper and should include a heading.

3. Graphs and diagrams should be submitted as sharp photographs on white glossy paper.

4. References in the body of the paper should refer to the author's (authors') name(s) and the date of publication. For example:

   According to Doe and Smith (1972)....

   ....has been discussed in the literature (Doe and Smith 1972; Weinberger *et al.* 1984; Jones 1981).

5. References at the end of the paper should appear in alphabetical order. Journal references should include the author's (authors') name(s), date of publication, title of article, journal name, volume number, and the beginning and ending pages of the article. Please use the following format:

   Davis, H. E. and Jones, B. A. (1978). Seasonal variations in plasma hormones, Biol. Reprod. 88:271-273.

   List articles or chapters within a book as follows:

   deHaseth, J. A. (1982). Fourier transform infrared spectrometry. In: Fourier, Hadamard and Hilbert Transformations in Chemistry, (Marshall, A. G., ed.) Plenum Press, New York, pp. 387-420.

6. Technical papers should be written in an Introduction, Materials and Methods, and Results and Discussion format.

7. When reference is made to a particular product, state the manufacturer of the product and the city and state of the manufacturer's headquarters. For example:

   Isotactic PS (Dow Chemical, Midland, MI)....

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