California Association of Criminalists NEWSLETTER

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Lowell W. Bradford

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Also inlcuded with this mailing:

1. Minutes, Board of Directors Meeting, September 14, 1987

2. Minutes, Business Meeting, October 23, 1987

3. Minutes, Board of Directors Meeting, January 25, 1988

4. California Controlled Substances List, compiled by Marilyn Silva Fink, Marftin C. Fink and Hiram K. Evans

April 1988

Conferences and Seminars

SOUTHERN ASSOCIATION OF FORENSIC SCIENTISTS
May 5-7, 1988
The Spring, 1988, Seminar of the Southern Association of Forensic Scientists will be help at The Peabody--"The South's Grand Hotel"--in Memphis, Tennessee. Anyone interested in attending or in presenting a paper in one of the technical section meetings (Toxicology, Serology, Solid Dosage, Criminalistics, Pathology/Biology, Firearms) should contact Steve Nichols or Paulette Sutton, University of Tennessee--Toxicology Laboratory, 3 North Dunlap, Memphis TN 38163, (901)528-6355.

CALIFORNIA ASSOCIATION OF CRIMINALISTS - 71st SEMI-ANNUAL SEMINAR
May 19-21, 1988
The Spring, 1988, seminar of the California Association of Criminalists will be held May 19-21 at the Marriott Marina Hotel, Berkeley CA. For further information contact Charles Morton. Institute of Forensic Sciences - Criminalistics Laboratory, 2945 Webster Street, Oakland CA 94609. (415) 4512-0767.

SYSTEMATIC ANALYSIS OF LOW EXPLOSIVES
June 13 - 17, 1988
The Bureau of Alcohol, Tobacco and Firearms will conduct a course in the Systematic Analysis of Low Explosives, to be held at the BATF national Laboratory Center in Rockville, MD. For further information, contact Rick Stroebel, ATF National Laboratory Center, 1401 Research Boulevard, Rockville, MD 20850 (202)294- 0420.

ANNUAL CONFERENCE
CANADIAN SOCIETY OF FORENSIC SCIENCES
October 19 - 21, 1988
The annual CSFS Conference will be held OCtober 19 - 21, 1988, at the Westbury Hotel in Toronto, Ontario. The theme of the meeting is "Advances in Technology: The Impact on Forensic Science." For further information, contact the Canadian Society of Forensic Science, 2660 Southvale Crescent, Suite 215, Ottawa, Ontario Canada K1B 4W5. Telephone (613) 731-2096.

14th ANNUAL MEETING OF THE NORTHEASTERN ASSOCIATION OF FORENSIC SCIENTISTS
October 21-22, 1988
The 14th annual NEAFS meeting will be held at the Mystic Hilton in Mystic, Connecticut. For further information, contact Steve Sottolano, Drug Enforcement Administration, Northeast Laboratory, 555 West 57th Street, Suite 1886, New York NY 10019. (212) 399- 5137

41ST ANNUAL MEETING OF THE AMERICAN ACADEMY OF FORENSIC SCIENCES
February 20-25, 1989
This conference will be held at the Riviera Hotel, Los Vegas, NV. Contact AAFS, 225 South Academy Blvd., Colorado Springs, CO, 80910. (303) 596-6006.

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

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

FSI Subscriptions

Individual subscriptions to Forensic Science International are available at the discount rate of $90.00 per year through the CAC. If you are interested in a subscription to Forensic Science International, send a check for CAC Treasurer Dan Gregonis, San Bernardino County Sheriff's Office, P.O. Box 1557, San Bernardino CA 92402. Current subscribers through the CAC should be contacted about their renewal in September. If you do not receive a renewal notice from the CAC, contact Dan.

Job Openings

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

CRIMINALIST III
The City of Mesa, Arizona, has an opening for a Criminalist III position funded for the first year by a Grant from the Arizona Criminal Justice Commission. The job requires a degree in Criminalistics or a related field, six years of experience in a forensic laboratory and experience testifying in court as an expert witness. The salary is $33,514. - $45,214. For additional information, contact City of Mesa Personnel Department, 64 East First Street, Mesa AZ 85211-1466.

CRIMINALIST
The City of Los Angeles has openings for several criminalists. The position requires a degree in criminalistics, biological science, or chemistry. A written examination is also required. The starting salary range is $2607 - $3236. For additional information, call 213-485-4142, 800-252-7790 ext. 4142 (within California) or 800-421-9555 ext. 4142 (outside California).

CRIMINALIST (Part time)
The City of El Cajon has a part time position for a person with 3-4 years experience in criminalistics. The job requires a degree in criminalistics or a related field. The salary is $16.77 - $20.43 (hourly). For further information, contact the Personnel Department, 200 East Main Street, El Cajon CA 92020.

CRIMINALIST TRAINEE
The State of California has openings for Criminalist-Trainees. This is an entry level position requiring graduation from college with a degree in a physical science. * semester hours of quantitative analysis is required. The salary range is $1873. to $2140. per month. For additional information, contact Department of Justice, Testing and Selection Office, 1515 K Street Room 227, P.O. Box 944255, Sacramento CA 94244-2550.

CRIMINALIST I
The City of Phoenix has an opening for a Criminalist I. The position requires a Bachelor's Degree in Chemistry, Criminalistics or a related field. The job duties include the analysis of drugs and narcotics, and blood alcohol analyses. For additional information, write City of Phoenix, Personnel Department, 135 North 2nd Avenue, Phoenix AZ 85003. (602) 262- 6277.

CAC Merchandise

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

The current offerings are listed here. if you would like to see a particular product offered, contact John DeHaan or Grady Goldman.

Sweatshirts- various colors (50/50 blend): $10.00

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

Mugs: Glazed ceramic mugs: $4.50

Kerchiefs: Navy: $7.00 (other colors on request)

Name Badges: Custom engraved (name & agency): $5.00

Patches: CAC logo only, black-on-white: $5.00

DNA Analysis Guidelines

A number of forensic science organizations have adopted positions or policy statements related to use of DNA analysis in forensic laboratories. Several of these policy statements, from the California Association of Crime Laboratory Directors, the American Association of Blood Banks Parentage Committee, and the Society for Forensic Haemogenetics, are included here for the information of CAC members.

CALIFORNIA ASSOCIATION OF CRIME LABORATORY DIRECTORS POSITION ON DNA TYPING OF FORENSIC SAMPLES

Background

DNA typing promises to revolutionize forensic serology. It is not surprising that DNA's unprecedented power for discriminating biological samples has produced pressure to use it in criminal cases. As forensic laboratory managers, we are responsible to ensure that the appropriate scientific issues have been considered as we introduce this new tool. We must provide sound leadership, drawing on our collective technical background and experience to guide this important process.

As with any new forensic procedure, implementation of DNA typing must be approached with great regard for long and short range legal implications while ensuring that the quality of justice does not suffer from an excess of caution. We must lay a solid foundation in our laboratories for the introduction of these techniques. We must also take care that our precautions do not obstruct the appropriate use of new technology by those who may already be qualified to apply it.

An analogy exists between our present attempts to begin typing DNA on evidence samples and the introduction of enzyme typing in U.S. crime laboratories in the early 1970's In both instances, biochemical procedures which had been developed for genetic research, clinical diagnosis, and paternity studies have been transferred to application on evidence materials. Such terminology transfers require consideration of the nature of evidence samples, which are often limited in size and partially degraded. The potential effects of environmental influences on DNA typing results must be considered- based both on existing biochemical knowledge and on empirical studies under simulated evidence conditions- just as was done with enzyme marker systems.

In another sense, the present situation with DNA typing differs from our earlier experience with protein markers. Like most new technology, protein marker typing found its way through the crime laboratory into the courtroom at a gradual pace. This process has been accelerated in the case of DNA typing, driven by the unusually rapid progress of molecular biology research at universities and in the private sector. Crime laboratories are placed in the position of needing to provide sound advice to their client agencies regarding the value and limitations of a service available from private vendors before they have acquired the skills to provide it in their own laboratories.

DNA Guidelines

The "ASCLD Guidelines for Forensic Laboratory Management" and the CAC-DOJ "Report of the Symposium on Forensic Serology-1987" include recommended procedures for the validation and implementation of new methods in forensic laboratories. These procedures apply as well to DNA typing as to any other serology technique, and they apply equally well to the private sector as to public laboratories. They and the the guidelines which follow provide criteria by which the members of the forensic science community may judge the acceptability of new methods, evaluate the work product of private vendors and establish their own DNA typing programs.

1) A laboratory providing DNA typing for forensic purposes should have staff knowledgeable in both basic molecular and forensic science.

2) The laboratory must have procedures for ensuring sample integrity, chain of possession and evidence preservation.

3) Genetic studies and population frequency data on the markers typed must be available for review.

4) Methods used for typing must have been evaluated by blind trial testing on samples simulating case evidence materials, and the results of such testing materials and the results of such testing must be available for review.

5) Procedures used for typing must be disclosed, and probes must be available to other laboratories for the purpose of replicating validation studies or independent reanalysis of evidence.

6) The analytical report must specify the probes and restriction enzymes used for typing and should include a narrative interpretation of the results.

7) The entire work product of the analysis (e.g. membranes, photographs of gels, other raw data) must be available for outside review.

Conclusions

The basic knowledge of molecular biology and the experience of those forensic groups doing work in the area strongly support the use of DNA typing technology in the forensic context. This is not to say that all potential questions have been answered. However, the current level of knowledge and experience is sufficiently advanced that individual forensic laboratories con move toward application of this new technology.

The CACLD strongly supports research such as that now underway at the University of California on the effects of environmental factors on DNA. We encourage our members to support their staff members in obtaining basic academic and research experience in molecular biology which we hope will lead to implementation of DNA techniques in the crime laboratories of this state in the near future. We also encourage the CA DOJ Bureau of forensic Services to pursue the long range goal of providing training in DNA techniques and establishing a statewide data base of DNA typing information for criminal identification.

Meanwhile, the CACLD will continue its efforts to monitor the progress of forensic DNA typing in the private sector through site visits and blind trials. We recommend that our members carefully evaluate any proposed DNA evidence analysis on a case- by-case basis, in the light of the guidelines above and in consultation with the legal community in their own jurisdictions.

This position was endorsed by a vote of the CACLD members present at the business meeting held at Newport Beach, California, on November 20, 1987

This position has also been endorsed by the Board of Directors of the California Association of Criminalists.

AABB PARENTAGE COMMITTEE

PROPOSED STANDARDS FOR TESTS INVOLVING DNA POLYMORPHISMS - NOVEMBER 1987

I. The use of a particular DNA probe system should be validated by extensive family and population studies that show that the particular system exhibits Mendelian inheritance and a nondetectable or acceptably low frequency of mutation and/or recombination.

II. Size Markers with discrete bands of known sequence should span and flank the entire range of the DNA system being tested.

III. A visual record of the ethidium bromide pattern resulting form electrophoretic separation shall be kept.

IV. A known human control DNA and DNA fragment of known size should be used during each electrophoresis run as a control for the resolution of the system.

V. A method shall be available to assure complete endonuclease digestion of DNA for testing. This should be accomplished by two or more of the following procedures:

1. Quality control of new lots of endonuclease by digestion of known human and lambda DNAs.
2. Electrophoresis of an aliquot of digested DNA with or without lambda DNAs. 3. Hybridization with probe which detects a non-variable locus.

VI. Autoradiographs or membranes must be read independently by two or more individuals.

VII. Reports listing the DNA probe testing shall specify the probe, restriction endonuclease used, and chromosomal location of the fragments visualized as defined by the International Human Gene Mapping Workshop.

VIII. Reported allelic fragments shall be listed by size or allele description (alpha numeric).

IX. Data analysis to compute a paternity index shall be function of allele frequency databases for DNA probes. DNA probes which detect multiple highly polymorphic loci should provide an explanation and definition for inclusions based on this methodology (P7.244)

X. Confirmatory testing by an independent laboratory shall be possible for all DNA tests.

STATEMENT OF THE SOCIETY FOR FORENSIC HAEMOGENETICS CONCERNING DNA-POLYMORPHISMS

RESOLUTION

1. The Society for Forensic Haemogenetics has followed attentively the recent evolution of DNA genetics especially regarding the various applications of DNA genetics especially regarding the various applications of DNA polymorphisms (RFLPs, DNA-fingerprints) in the field of forensic sciences. The use of DNA polymorphisms represent an extremely useful tool for research concerning the human genome and for the recognition of inherited diseases.

2. The Society appreciates the efforts made by commercial firms to build up technologies and prepare reagents for the investigation of DNA polymorphisms. The Society recognizes that important basic discoveries and developments in methodology have been achieved by commercial firms but expects that the companies involved in this field will make technologies as well as reagents, especially DNA probes, available to the community of scientists and investigators, in a way that legitimate interests of the firms such as patent rights and commercial exploitation are fully respected.
3. The Society would deplore a situation whereby the tools for the application of DNA polymorphisms in various medi-

cal fields would be subject of a monopoly. Such action would impede the solution of crimes and the efforts to help illegitimate children to identify their biological father as well as the diagnosis of inherited diseases .

4. The Society disagrees with a practice of DNA testing which obstruct access to a second opinion in legal cases, which is a basic principle of forensic science. The history of forensic science has demonstrated the importance of such second opinions and various national and international legal rights take this into account. Therefore any probe used in cases must be available to all other experts in the forensic field. Failure to meet this requirement makes the use of such probes unacceptable.

5. In the opinion of the Society it would appear premature at the present time to use DNA testing in isolation in parentage investigations. The continual use of established blood group polymorphisms whenever possible will allow experience to be gained to provide confidence in the results obtained with the new technology.

6. The Society would like to state that certain areas of DNA testing need to meet certain requirements if the technology is to be assured of a smooth acceptance both in the laboratory and most importantly in the courts.

These include:

a) Validation of probes by extensive family testing.

b) Duplication in testing

c) Establishment of gene frequencies and mutation rates for the genes in question.

d) The controlling of DNA digestion and the use of DNA size standards.

DNA-COMMISSION

With special concern to the discussion about application of DNA- polymorphisms in forensic haemogenetics the Society decides to form a commission on this subject. This commission has the following tasks:

a) To collect and to distribute information

b) To distribute practical knowledge e.g. by the organization of workshops.

c) To work out standards for the use in forensic science.

The commission consists of equal parts of members of the board and especially acknowledged experts. The commission is convened by the board.

The Best Paper Award

The papers presnted at the May seminar will be judged by a panel of reviewers, and an award for the Best Paper will be made based on the panel's reviews. The award will be announced and the presentation made at the Fall Seminar in Orange County.

The winner of the best paper award for the Fall seminar was Luke Haag for his paper "Projectile Induced Mechanical and Thermal Effects in Fibers" This is the second time Luke has won this award.

Winners of the Best Paper Award for the past several seminars are:

Spring 1986
Luke Haag, "Measurement of Bullet Deflection and Behavior after Striking Intervening Objects"

Fall 1986
Loren Sugarman, "Concentration and Isolation of Gunshot Residue for Particle Analysis"

Spring 1987
David Stockwell, "Evaluation of Non-Equilibrium Isoelectricfocussing for Esterase-D, Acid Phosphatase I, Adenylate Kinase, and Adenosine Deaminase. Modification of Kuo."

Fall 1987
Luke Haag, "Projectile Induced Mechganical and Thermal Effects in Fibers"

Blood Alcohol Proficiency Samples

The following exchange of correspondence between Kathy Holmes, the CAC's Department of Public Health-Liaison Committee Chairwoman, Jim Norris from the San Francisco Police Department Crime Laboratory, and Daniel Morales of the Department of Public Health is reprinted for the information of the CAC members.

16 December 1987

Kathy Holmes Chairperson,
Public Health Liaison Committee
California Association of Criminalists
c/o Contra Costa County Criminalistics Laboratory
729 Castro Street Martinez, CA 94553

Dear Ms. Holmes:

This is to thank you for your letter of November 20, 1987 summarizing the subjects that the members of your association wish to be addressed at the forthcoming meeting of the Advisory Committee on Alcohol Determination. One of those subjects was, "A proposal to either change the type of containers in which the proficiency test samples are sent or to irradiate the samples or to screen the samples for AIDS and Hepatitis."

I would like to address immediately the issue of screening the samples for AIDS and hepatitis. This is to inform you and your group that the blood matrix used in the preparation of the forensic alcohol proficiency test samples has been screened for HIV (AIDS) and hepatitis antibodies. Testing is performed by the local blood banks from which we obtain the blood supply for preparing the proficiency test pools. We purchase only blood units which have been screened negative for HIV (AIDS) and hepatitis antibodies. Although the blood supply is screened negative for AIDS and hepatitis, we still include the following statement in the directions which are enclosed with the test samples sent to proficiency test participants; "BIOLOGICAL SPECIMENS MAY CONTAIN UNDETECTABLE INFECTIOUS AGENTS. THESE PROFICIENCY TEST SAMPLES SHOULD BE HANDLED AS POTENTIALLY INFECTIOUS MATERIALS."

I hope I have clarified this portion of the concerns of your group relative to the forensic alcohol proficiency testing program. I encourage you to communicate this response to your membership.

Sincerely,

Daniel R. Morales, Ph.D. Chief, Clinical Chemistry Laboratory Department of Health Services

Reply to the above letter by James Norris January 28, 1988

Kathy Holmes Chairperson,
Public Health Liaison Committee
California Association of Criminalists
c/o Contra Costa County Criminalistics Laboratory
729 Castro Street Martinez, CA 94553

Dear Kathy,

As a member of the California Association of Criminalists (CAC) Board of Directors, I have been asked by CAC President Faye Springer to write to you concerning the issue of the Department of Health Services shipping proficiency samples for blood alcohol analysis in glass ampoules that must be broken open prior to analysis.

I have also read the letter sent to you by Dr. Daniel Morales of the Department of Health Services (DOHS), dated December 16, 1987, concerning this matter.

Bluntly stated, the response by Doctor Morales is unsatisfactory. The real issue is not whether the blood used to prepare the proficiency samples has been screened for the HIV virus, but whether to use the glass ampoules, that must be broken to store and transport those samples. It must be remembered that, even though these blood samples have been screened for antibodies to the HIV virus, they can still contain the virus and be infectious. Packaging such blood samples in break-open ampoules is satisfactory if no other method of storage is possible. However, such a method of storage is unsatisfactory if there are alternate ways to store and transport this type of sample. There are several ways to store such samples that do not involve nearly as much risk to the analyst as the present method used by the DOHS.

Our experience in storing volatile compounds in non-glass containers and in glass containers that do not need to be broken to open, indicates that these alternative storage methods are suitable and could be used by DOHS with little or no added expense or expenditure of time.

The labeling of these samples with a warning, as DOHS presently does, is commendable, but does not prevent possibly tragic accident from occurring. At any rate, the new Centers for Disease Control (CDC) guidelines for health-care workers and laboratory personnel require "universal" precautions be taken. That is, all samples should be considered potentially infectious. A corollary to this recommendation requires that all unnecessary risks be eliminated.

Packaging human blood samples in glass vials that need to be broken open is such an unnecessary risk.

I request that this issue be addressed at the next Advisory Committee on Alcohol Determination meeting. Further, I hope that action on this matter could be taken prior to that meeting, which I understand has not yet been scheduled, so that the risk to members of our Association posed by this packaging method will be eliminated as soon as possible. My conversation with Board members at our last meeting indicate that they support this request.

If you have any questions regarding this matter, please do not hesitate to contact me.

Yours truly,

James L. Norris
Immediate Past President, CAC

In response to this letter, the following letter was received from Dr. Morales:

March 2, 1988

Kathy Holmes Chairperson,
Public Health Liaison Committee
California Association of Criminalists
c/o Contra Costa County Criminalistics Laboratory
729 Castro Street Martinez, CA 94553

Dear Ms. Holmes,

Your letter of February 8, 1988, together with Mr. Norris' letter of January 28, 1988, which you enclosed, merit serious and immediate attention.

Accordingly, we will suspend further proficiency testing until alternatives have been examined. As you know, among the advantages of the present procedure in which we use sealed glass ampoules is the preservation of volatile ethyl alcohol from losses due to evaporation and leakage. Another advantage in the lack of contamination of samples by stoppers, caps, and cap liners. As we examine alternatives, I welcome the cooperation of the California Association of Criminalists in helping us to devise a means for storing and shipping the proficiency tests samples in a manner which will not compromise their integrity for reasons of contamination,leakage, or loss of volatile ethyl alcohol. In his letter to you, Mr. Norris states his experience in this regard. I would appreciate his sharing with us his experience, including specifics about containers and closures, together with data demonstrating the maintenance of alcohol concentrations in blood and lack of contamination. In the meantime, we will begin to examine alternatives to the sealed glass ampoules.

Sincerely,

Daniel R. Morales, Ph.D.
Clinical Chemistry Chief

Northern Section Drug Study Group

Ken Fujii, Chairman

Contra Costa Sheriff's Department
1122 Escobar Street
Martinez CA 94553

The Drug Study Group held a meeting at the Oakland Police Department on January 28, 1988. Tom Abercrombie, of DOJ- Riverside, described the synthesis and identification of N,N- dimethylamphetamine. This compound appeared on the drug scene because the sale of Ephedrine (a precursor of methamphetamine) became reportable. The precursor, N-methylephedrine, was marketed as a replacement for ephedrine. Tons of the precursor have been traced from the supplier in New Jersey to chemical supply houses in California.

Synthesis: Reduction with HI is the predominate method
-Leuckart condensation with dimethylformamide or reductive amination with P2P and dimethyamine both work.
- See "Microgram", Vol. 12, No.6, 1979,pp 125-134, Alvarez.

Identification: + Marquis
-Secondary Amine, unless contaminated with methamphetamine.
+ CoSCN
Screen by GC or TLC (T-1, or Hexane: Benzene:Diethlyamine, 75:25:10, visualize with acidified IPT).
-Identify by IR or microcrystal test (Au in H_3PO_4 hanging drop), Mephentermine indistinguishable by mass spec.
Cookers will mix ephedrine with methylephedrine resulting in mixtures of methamphetamine and dimethylamphetamine. -The precursor, N-methylephedrine, contains a small amount of ephedrine as a contaminant.

Kilogram quantities have been seized in Southern California and as far North as Fresno and King counties. Most Bay Area laboratories have had samples submitted for analysis.

Emergency legislation is in the works to make N-methylamphetamine a controlled substance.

A handout included structures, UV, IR, GCMS and MSDS.

The efficacy of crystal tests was discussed. The Study Group's position is that microcrystal tests are a valid means of drug identification.

Ken Fujii reported on an MDMA synthesis involving piperonylacetone, methylamine hydrochloride and sodiumcyanoborohydride. Copies of a journal article describing the reaction were distributed. BNE considers methylamine hydrochloride equivalent to Methylamine with respect to the reporting requirements of Section 111000 H & S.

Mark Kalchik reported on a large PCP lab found a a pig farm. Ether and magnesium fires were encountered together with clouds of cyanide fumes. Extensive soil removal was required because of chemical dumping. The health and consumability of the livestock in in question. Clean-up was curtailed after $30,000 was spent. Additional funds are needed to complete the job. Total costs my exceed 100,000.

Recent Casework:

Just about everyone reported submissions of dimethylamphetamine. In addition, the following were reported:

San Mateo County- Cocaine processing lab.
Alameda County - MDMA from Berkeley
Contra Costa County - MDMA, lab packed up in a van.
-Fentanyl, reportedly purchased in Oakland
Valley Toxicology - PCP base on oregano
DOJ - Fresno - Meth. HCl rocks, appears like epsom salt
- lumps of PCP base.
DOJ - Riverside - Small tablets of LSD, light green or kelly green contaminated with cocaine.

California Criminalistics Institute: An Update

Cecil Hider, Manager

California Criminalistics Institute

As you are aware, in September 1986 Governor Deukmejian signed SB 2390 which created the California Criminalistics Institute (CCI). The Institute was given a charge to lead a comprehensive and coordinated approach to "meet the high technology forensic science needs of crime laboratories".

The legislation also provided for the appointment of a Users Advisory Board. This board is composed of representatives from the California Association of Criminalists, the California Association of Laboratory Directors, The International Association of Identification, the University of California, The Federal Bureau of Investigation, the California Association of Toxicologists, The Commission for Peace Officer Standards of Training, and the Drug Enforcement Administration. This group is chaired by the Chief of the Bureau of Forensic Services of the California Department of Justice.

In order that we may keep you better informed of our activities we have decided to issue updates of our plans and ideas on a regular basis.

The CCI program is progressing on schedule except for the acquisition of space. It is now contemplated that the space identified will not be available for modification until sometime after July 1988.

Our plans to provide training at an early date have not changed. Alternate sites will be selected to teach courses. In addition to the hiring of four program managers, whose updates are part of this report, we have hired additional staff. Eric Mosier has been hired as Senior Forensic Librarian and is in the process of acquiring reference materials which will accessible to the other forensic sites within California via computers which will be purchased by us. Most of you should have met Eric by this time during his recent tour of forensic lab sites. John Ackrill of the Home Office Laboratory of Huntington, England has been chosen to head the Microscopy Program. He will report when his immigration requirements are met. Microscopes for this program are now on order. Kenneth Konzak from the Montana Department of Justice has been hired and will be placed full time with George Sensabaugh at UC Berkeley, beginning March 2, 1988. Ken will assist George in his DNA Research Program. We are also providing financial assistance to the UC Berkeley DNA Research Program. Program managers comments follows.

I. BIOLOGY PROGRAM - Linda Hartstrom

The formal training courses we have planned will be for the most part, directed toward satisfying the training needs of the novice criminalist. We have not forgotten, however, the needs of the experience serologists. In addition to the formal courses, we plan to offer one day seminars covering various topics of interest. Some will cover basic background material and others will cover topics of current interest. These seminars will include the history, theory, analytical procedures and troubleshooting for each of the areas. The first formal course to be offered this summer will be the Forensic Examination of Sexual Assault Evidence.

The following list identifies the courses which we propose to provide for the first two years of our program. I am very interested in hearing from you regarding additional courses or topics for the seminars. Please send your comments directly to me in Sacramento.

California Criminalistics Institute
4949 Broadway, Room F-104
Sacramento, CA 95820
Attn: Linda Hartstrom/Biology
(916) 739-5629

Formal Courses (Lecture and Laboratory)

Basic Blood Grouping (1 week)
Analysis of Blood Group Enzymes 1 (2 weeks)
Analysis of Blood Group Enzymes 2 (1 week)
Analysis of Serum Proteins (1 week)
Forensic Examination of Sexual Assault Evidence (2 weeks)
ELISA (1 week)
IEF Procedures (1 week)
Isolation of DNA from blood and semen (1 day)

ONE DAY SEMINARS
(Lecture)

Red Cell Antigens-Lewis and ABO
Theory of Electrophoresis-Zone and IEF
Enzymology-PGM, EsD, Pep-A, Glo
Enzymology-EAP, ADA, AK
Serum Proteins-Gc, Tf, Hp
Use of Statistics in Forensic Serology
Molecular Biology for the Forensic Serologist
Allotyping

We want to use instructors from the Bureau of Forensic Services, city and county crime laboratories, and private research laboratories. We also hope to have instructors from the American Blood Bank and the UC system. If you know of anyone who would be interested in participating as an instructor, send their names to the above address.

II. CHEMISTRY PROGRAM - John P. Bowden

One of the most serious problems confronting law enforcement at this time is the proliferation of illicit drug manufacturing laboratories. This has created a vast need for trained peace officers and forensic scientists to assail this problem. For several years I have been involved in the training of officers and agents in the area of clandestine laboratory investigation.

The first CCI course offered by the Chemistry Program will be "Forensic Investigation of Clandestine Laboratories". This course will deal with the investigation, assessment, dismantling, neutralization, sampling and disposal of illicit drug labs from a concept of safety. Proper use of protective and monitoring equipment will be stressed. We anticipate a follow-up course which will cover the topic of laboratory analysis of the complex chemical samples retrieved from clandestine drug operations.

Since November, I have been coordinating the training purchased in connection with our FTIR and GC/MSD instruments. With CCI, we hope to expand this type of training to include both theory and practice with a variety of instrumentation. Topics include gas and liquid chromatography, IR, and UV spectrophotometry, elemental analysis and numerous other subjects at levels ranging from basic to advanced.

We are looking forward to your suggestions concerning areas of training and interest. We will be drawing upon the entire forensic and scientific community for instructors. I wish to hear from those who would like to share their knowledge and experience with others. I can be reached at (916) 739-5558.

III. IMPRESSION EVIDENCE/MICROSCOPY PROGRAM - John DeHaan

The training courses we anticipate being able to host are listed below. The quality of each course will be our most important product. Although demand is high, classes will be limited to the numbers which can be comfortably accommodated in each. The equipment will be first-rate and will parallel, if not duplicate, the equipment found in most crime labs.

The teaching staff will be as wide-ranging as the topics including people from among BFS staff; UC-Berkeley, ATF and FBI laboratories; professionals from private and public sector crime labs and private industry, as well as consultants. Wherever the special expertise and ability to teach exist, we will be reaching out.

Impression Evidence/Microscopy Course

Basic Forensic Microscopy (1 week)
Advanced Forensic Microscopy (1 week)
Basic Latent Print Development (4 days)
Advanced Latent Print Techniques (1 week)
Laser Techniques - Applications and Safety (2 days)
Firearms Safety (20 hrs.)
Crime Scene Investigations in Correctional Facilities (3 days)
Systematic Analysis of Low Explosives (1 week)

Nominations for new course offerings and qualified instructors will be welcomed. Feel free to call me at (916) 839-5559 to discuss our courses and their content.

IV. QUALITY ASSURANCE PROGRAM - Louis A. Maucieri

My area of responsibility will be the Quality Assurance program administration. As so much of this topic touches on training, I will be conferring often with the other CCI program managers for expertise in their disciplines. If, after reading of my intended direction below, you feel you can offer suggestions of mutual benefit, I would like to hear from you. I can be reached at (916) 739-5484 or ATSS 497-5484.

Our existing proficiency test program is largely an "after-the- test" review/critique done by one specialist. I will change this from a work product inspection to a group review process. Tests will be reviewed anonymously with a structured discussion guideline to identify specific quality improvement measures to go back to the field laboratories. EAch participant lab will also receive a VTR of this process as a working resource for their facility. This will include open and blind (yet to be developed tests.

Additionally I expect to be developing operating guidelines for quality assurance in forensic laboratories and CCI and a course curriculum catalog for clerical, technical, and supervising staff. Finally, I will move to obtain POST certification for the Forensic Academy and Safe Handling of Firearms courses.

I sincerely hope my activities will be deemed helpful to the forensic science community beyond BFS also.

V. CCI LIBRARY SERVICES - Eric M. Mosier

The purpose of the CCI Library is to meet the informational needs of forensic scientists working in public sector crime labs statewide and to facilitate the sharing of information among them. To help assess informational needs and identify desired reference services, Eric Mosier, the CCI Librarian,m has visited most of the crime labs in California. During the first half of 1988 Eric will be in the process of developing basic information/reference services. In January he completed a list of its journal holdings and began to accept requests via phone and mail for only those journal articles which were available in the library's collection. As the crime labs begin to receive their Sperry PW2 microcomputers, they will be able to submit these journal article requests via electronic mail.

By Summer 1988, the CCI Library should b ready to expand its services as follows:

1) Accept requests for any journal article or book including those which must be obtained from other libraries.
2) Accept reference questions for specific information.
3) Perform online bibliographic searches of scientific databases via DIALOG.

In addition to these basic library services, the CCI Library will begin work during FY 1988/89 on such long range projects as the development of an online library catalog, the development of a facsimile system for rapid document delivery, and the development of information services designed to meet specialized needs. The CCI Library (916/739-5484) welcomes any questions, suggestions, or feedback regarding the development of any of the reference services listed above.

Recent Advances in Scientific Service to Law Enforcement

Presented Before the 39th Annual Conference, California State Division, of the International Association for Identification, May 25, 1955, at Santa Barbara, California, as the Opening Address.

Lowell W. Bradford

Laboratory of Criminalistic
Office of the District Attorney,
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[This paper is printed in this issue of the Newsletter to present newer members of the Association with a perspective on the development of Criminalistics in California as the celebration of the 50th Anniversary of the Forensic Science Program at UC Berkeley approaches. The current status of the program will be demonstrated at the May Seminar by a large number of papers presented by current students at UC. ed.]

This subject affords an opportunity for considering past events, historical trends, personalities, tributes, special contributions, areas which need further progress, educational trends m evolution of criminalistics and the eventual outcome of scientific application to police work.

Beginning signs of application of science to enforcement problems began to stir after 1900, like the first cry of a newborn infant, and a real revolution occurred in the 1920's when this infant became of age.

FINGERPRINTS as identification have been traced to ancient Babylonian clay plates, but it remained for Sir Francis Galton and Sir Edward Richard Henry to perfect a system useful to the police. The Galton - Henry System was firs t introduced in India and in 1901 was adopted by Scotland Yard.

FIREARMS IDENTIFICATION interests were also beginning to stir. Publications concerning this subject made their first appearance around the turn of the century. Developments were led by personnel of the U.S. Army Ordnance Department, initially by Col. Calvin S. Goddard (passed away a few months ago after an active career in firearms identification) and followed closely by Major General Julian S. Hatcher who, at the time, was a junior officer. Firearms identification developed into full blossom in the 1920's and culminated in 1935 with Julian Hatcher's book "Firearms Investigation, Identification and Evidence".

BERKELEY DEVELOPMENTS: In these years after the turn of the century, some notable "firsts" were taking place in Berkeley:

First Police Bicycle Patrol in the U.S.A. - - - - 1905

First Police Motorcycle Patrol in the U.S.A.- - - 1909

First Police Automotive Patrol in the U.S.A.- - - 1913

First Use of Scientific Crime Detection in the U.S.A. 1915

The impetus for these developments came from one of the greatest police leaders of all time: Chief August Vollmer of the Berkeley Police Department. This individual, imaginative, a man of action and executive ability, showed the world how business, engineering and scientific principles could be applied to police problems. The lie detector of=r "polygraph" as it is known, began to be developed in 1921 under his guidance and sponsorship. He later went on to help reorganize many large police departments in this country along modern lines. He has given his ideas and sponsorship to many organizations and projects aimed at the solution of criminal problems. He has been behind all of the advances in police education in California and has been a consultant to many other areas. There is a grate tribute owed to August Vollmer in respect to his role in the advancement of police techniques.

His presence in Berkeley gave rise to a curriculum in Criminology at the University of California. This is today the only University in the world offering a curriculum in criminology at the graduate level and a program in Criminalists for the undergraduate. It likewise is the only fountain head of new methods and data in Criminalistics.

In recognition of the application of scientific principles to police administration, he was awarded the Academy of Science "Public Welfare Medal" in 1934 .

NATIONAL SCENE; Of basic importance and interest to identification people was a move by the International Chiefs of Police in October of 1897 when a National Police Bureau of Identification for the maintenance of fingerprint records was established. This Bureau was moved to Washington in May, 1902.

During a twenty year period the IACP actively pressed for legislation to create a government sponsored identification bureau.

Meanwhile, in California, the State Division of Criminal Identification and Investigation was created by a legislative

act. The role played by the IACP on the national scene was played here in California by the "International Association for Identification". This California State Group helped bring about these services of identification on a state level on January 1, 1918.

On the National scene, J. Edgar Hoover is a noteworthy individual. Serving as Assistant Director of the F.B.I. from 1921 to 1924 and a s Director from 1924 to 1955 he has turned what was originally an inconsequential body into the largest, well-trained, closely coordinated group of its kind in the world. The F.B.I. has been quick to make use of new scientific developments and to offer complete identification service to any law enforcement agency requesting it.

THE EDUCATIONAL SCENE: The idea of professional training in the police field stemmed from August Vollmer as a result of his attempts in modernizing police administration. It is not surprising therefore that the University of California was the first school to offer courses in police work and, until the present time, is the only institution of its kind to offer an advanced degree in Criminology.

Since the early beginnings in Berkeley, a number of two-year pre- service training schools in police work have sprung up at the Junior College or State College level. Likewise In-Service training is administered though various state and federal programs.

The number of schools offering four-year curricula built around a core of coursed designed to provide an educational foundation for the police major is very limited. San Jose State College is the outstanding leader in the four-year vocational program and the University of California conducts the only four-year program in criminalistics in the world, besides maintaining the only graduate school in Criminology.

In a survey conducted by the Society for Advancement of Criminology it was determined that 22 colleges have one or two courses in Criminology and over ten have a core of courses making up a police curriculum. Of these ten two-year programs, seven are in California.

It is interesting to note that almost all of the college level programs were started by or are now directed by one of Vollmer's students, associates or proteges or someone who was trained by one of the following.

BOOKS: The build-up of courses of instruction brought forth a sudden requirement for textbooks and manuals describing standard police techniques in regard to the arts an crafts of basic investigation principles as well as the more scientific aspects such as the post-mortem examination, forensic psychiatry, and the phases of criminalistics. Some of these worked are classic, and are the only media by which so many students of law enforcement could possibly gain the special bits of knowledge which have been developed and put together by so few professionalists and scholars.

Of these books in the Police Field which have either or both characteristics of breaking new ground and being peerless in their approach to the particular problem, the fallowing come to mind as milestones:

Le Moyne Snyder on "Homicide Investigation" (1944)

Julian Hatcher on "Firearms Investigation, Identification and Evidence" (1935)

Albert S. Osborn on "Questioned Documents"

Soderman & O'Connell on "Modern Criminal Investigation"

O'Hara & Osterburg on " An Introduction to Criminalistics"

Paul L. Kirk on "Crime Investigation"

PUBLISHERS: In connection with publishers, the Charles Thomas Book Company should be mentioned. Mr. Thomas has an abiding interest in law enforcement and is constantly creating opportunities for authors on police subjects to disseminate their special experiences and information to law enforcement at large.

The only professional type journal which offers a medium of exchange of new information in scholarly thinking in criminology and in new developments in criminalistics is the "Journal of Criminal Law, Criminology and Police Science", published by the Williams and Wilkins Company.

CRIME DETECTION LABORATORIES: It is interesting to note the first use of a scientist in this country in crime detection was Dr. Albert Schneider, employed by August Vollmer in 1915 and that the first regularly constituted criminalistics laboratory to be established in the United states was created in 1923 by August Vollmer when he was called as a consultant to the Los Angeles Police Department. This first laboratory was closely followed by the inauguration of the Chicago Crime Detection Laboratory at Northwestern University, the New York Police Department, the F.B.I. and the California State Department of Justice Division of C.I. & I.

Ray Pinker as technical director of the Los Angeles Police Department laboratory has served longer that any other criminalist in California in the practice of general criminalists. Roger Greene of the C.I.&I. laboratory is next in order of service. These men are to be commended for the way in which they have contributed to the profession of criminalistics which they were helping to develop in those early embryonic years. Devoid of guidance or contact from any centers of criminalistic progress except their own, they maintained exceptional standards of ethical conduct and have both brought forth two of the most outstanding criminalists laboratories in the western part of the United States.

CRIMINALISTICS: All of these scientific and educational developments in the first quarter of the century have provided the ingredients which have brought forth a rela-

tively new profession, "CRIMINALISTICS". The criminalistics laboratory has a single well-defined mission. It provides the law enforcement officer with every possible scientific service which may be available in respect to the analysis, evaluation, and interpretation of physical evidence. In this connection the criminalistics laboratory makes use of the following principles:

1. Testing by classical methods

2. Departmental work when no classical methods available

3. Consults other scientific resources when the problem a hand exceeds the scope of laboratory facilities or training.

4. Constantly interchanges information and developments with other laboratories in the quest for better techniques.

The general practice of Criminalistics includes a number of specialties which are as follows:

1. Chemical toxicology - tests for poisons, drugs, narcotics on autopsy specimens, pills and capsules
2. Firearms identification (sometimes miscalled "ballistics")
3. Comparative microscopy
4. Serological testing (blood tests)
5. General chemistry
6. General microscopy
7. Spectrochemical analyses (spectrograph spectrophotometer)
8. Questioned document examination
9. Technical photography:
   A. Photomicroscopy - bullet comparison
   B. Footprint overlay
   C. Photo-matches on tool marks
10. X-Ray diffraction 11. Specialized aspects of fingerprint work - poroscopy

PROFESSION: The word "profession" has been mentioned in connection with Criminalistics. It is interesting here to speculate on the concept of the word "profession". The best definition of "profession" that comes to mind is that given by Vannevar Bush, a great contemporary chemist and former President of the American Chemical Society; these are his words:

> "The Hallmark of a profession is that its members minister to the people. It is out of the concept of ministry - of the assuming of responsibility for the vital affairs of others because of superior (large in amount) specialized knowledge - that there have grown the idealism of the professional man and the recognition in him by others of a quality of altruism which is its own reward. Upon this recognition by the people is based the continuance of a profession, for it exist only as the people because of confidence in its integrity and faith in its general beneficence, permit it to maintain its own prerogatives and to speak with authority in its own field".

It is the formation of this Profession of Criminalistics which I believe is the most recent advance in scientific service in law enforcement. There are at least sixteen persons at the present time trained and engaged in the general practice of criminalistics in California, plus an unknown number of technicians practicing in the various special phases.

It may be of interest to this group assembled here to show some evidence that this is truly a profession in the sense described by Vannevar Bush. In this regard, those who are now engaged in the general practice of criminalistics have formed what is now as the California Association of Criminalists. The aims of this common bond are self evident from the Preamble of the Constitution of the C.A.C.:

PURPOSES OF THE C.A.C. ARE TO:

1. Foster an exchange of ideas and information within the field of criminalistcs.

2. Foster friendship and cooperation among the various laboratory personnel

3. Stimulate research and the development of new techniques within the field

4. Encourage financial support for worthy research projects

5. Encourage the compilation of statistical data of value in the field

6. Promote wider recognition of the science of criminalistics as an important phase of jurisprudence

7. Maintain a high level of professional competence among=g criminalists in the state

8. Encourage standard qualifications and requirements for criminalists and other related specialists

9. Disseminate information to the legal profession concerning minimum qualifications for physical evidence consultants

10 Provide a Board of Arbitration or Review in certain cases involving differences of technical opinions when indicated

11. Encourage the use of improved testing procedures and methods of presentation of conclusions

12. When appropriate to review and act upon any pending legislation which appears to be related to the field of criminalistics

13. Encourage the recognition of this Association and its purposes among other appropriate groups and societies

14. Lend assistance, whenever possible, in the formation of college curricula and law enforcement training programs

15. Establish a code of ethics for criminalists

The association meets twice annually in seminar-type sessions for the purpose of discussing new technical developments, controversial problems, and methods of implementing the purpose of the organization.

The code of ethics is of the utmost significance in the guidance of professional conduct. The C.A.C. is shooting for a high standard as evidenced by this first paragraph in the draft now being considered by the Association:

"THE SCIENTIFIC ANALYSIS OF PHYSICAL EVIDENCE SPECIMENS":

1. A truly scientific spirit is by nature inquiring, progressive, logical, and unbiased. The principles of scientific method could be not better expressed than to repeat here "The Four Precepts" of Renee Descartes, philosopher and mathematician of the Fifteenth Century:

"The first, was never to accept anything as true when I did not recognize it clearly to be so - that is to say, carefully to avoid precipitation and prejudice, but to include in my opinions nothing beyond that which should present itself so clearly and distinctly to my mind that I might have not occasion to doubt it.

"The second, was to divide up the difficulties which I should examine into as many parts as possible, and as should be required for their better solution.

"The third, was to conduct my thoughts in order, by beginning with the simplest objects and those most easy to know, so as to mount little by little, by stages, to the most complex knowledge, even supposing an order among things which did not naturally stand in an order of antecedent and consequent.

"And the last, was to make everywhere enumerations so complete, and surveys so wide, that I should be sure of omitting nothing"

All for the purpose of insuring a uniform and high standard of ethical and moral conduct in the practice of Criminalistics.

In closing, I wish to point out that all of the beneficial major trends in scientific service to law enforcement have come from the conference principle. The IACP caused the formation of the National Federal Bureau of Investigation. The I.A.I. helped to cause the formation of the State Division of Criminal Identification and Investigation. The gathering together of scientific personnel caused the formation of the California Association of Criminalists. All of these meetings of craftsmen and professionalists have brought forth a dissemination and exchange of ideas, the total of which has brought many local successes plus the overall march of progress.

It has been said that the easiest way that a scientific worker can fall into inefficient habits and may cause an atmosphere for errors is for him to practice "ISOLATIONISM".

MEMBERS OF THIS CONFERENCE, do not miss the opportunities of this Conference get-together to quiz your neighbor, make new acquaintances and to find out new things. The opportunities for new knowledge are as great at the banquet table and social room as they are at the scheduled program. Put yourself out to talk shop with your new acquaintances, they will like it as much as you will.

If each person here can take home one new idea and execute it to the betterment of his own operations activity, your presence here will have been justified and the purpose of the Conference will have been carried out.

On this note, permit me one closing quote - I read from the Proceedings of the 20th Annual Convention of the International Association for Identification a Long Beach in 1934 - the Forward to the printed Proceedings - by the Editor, J. Clark Sellers:

"If education can be described as the assembling, correlating, assimilating and adopting to one's own use the experience of others, then the Convention has the distinction of being truly educative". I hope that the same remark can apply to this Conference.

EDITOR'S NOTE ABOUT THE AUTHOR:

Mr. Bradford in 1948 organized the Laboratory of Criminalistics in Santa Clara County and has been the Director since that time. In addition to rendering official criminalistic services to the law enforcement agencies in that County, he acts as a consultant for law enforcement chiefs of many other areas and is a consultant to many law firms in connection with physical evidence of a civil nature. He teaches Physical Evidence in the Police School at San Jose State College. He is a charter member and First Executive-Secretary of the California Association of Criminalists.

Advances in Science and Technology Challenge Constitution's Principles

(Developments in biology, chemistry, electronics, and computers test basic premises of democratic governance and individual rights as U.S. Constitution starts its third century)

Advanced technology will test the basic premises of American government in the years to come" concludes a paper, "Science, Technology, and the Constitution," issued last month by the Office of Technology Assessment.

. . . when the Constitution as signed in 1787, technology and science limited t he scope and powers of government. Government action could be obtained and individual rights protected by the simple prohibitions in the Bill of Rights. Now, 200 years later, the situation is totally different. "The pace of scientific and technological progress is relentless, offering us powers not dreamed of in 1787," notes the OTA paper. Technology not only permits exploration beyond Earth, inside the atom, and within the human brain and genes. Technology also allows modification of the human body, brain, behavior, and even genetic heritage. And scientists can intervene at both the start and the end of life.

Another set of constitutional issues raised by advances in science and technology relates to the Fourth, Fifth, and 14th amendments. The Fourth Amendment protects the privacy of citizens and prohibits unreasonable searches and seizures. The Fifth Amendment prohibits taking of life, liberty, or property without due process of law and forbids compelled self- incrimination. And the 14th Amendment provides equal protection under the law to all persons.

In 1787, the Fourth Amendment was understood to limit and regulate physical entry to a person's property and seizure of papers or other effects. Now there are nearly unlimited capabilities for electronic surveillance. Intelligence and law enforcement agencies can locate, identify, and monitor people or vehicles by picking up images, sound waves, vibrations, heat or light. Some local authorities already use, instead of a prison sentence, house arrest continually monitored by an electronic bracelet on the prisoner.

In legislation last year, Congress brought many new electronic technologies under constitutional protection against unreasonable searches and seizures. Congress and the courts will surely have to consider additional new technologies in the future.

At the opposite extreme from this remote sensing is what OTA calls "intimate sensing" - including analysis of body tissues and fluids and potential use of DNA sequence analysis (DNA Fingerprinting) for identification. Also included are new techniques for finding fingerprints (using powders, chemicals and lasers) and computer systems to match them against huge file banks of prints. And biometric security systems can identify a person by hand geometry, voice patterns, retinal blood vessel patterns, or other physical characteristics. These technologies are revolutionizing forensic science.

These methods can be used to detect the presence or identity of persons, track their movements, or produce evidence of their past behavior - for example, u se of drugs, sexual activities, or exposure to disease. The courts have held that blood , semen, fingerprints, hair, handwriting samples, and other such evidence can be seized without violating the Fourth or Fifth amendments. However, questions will continue to arise about privacy and the reasonableness of searches.

The rapid advance of techniques for obtaining data about a person's genetic and neurobiological make-up is laying the foundation for a variety of public and private information-gathering programs. However, controversy is growing over proposed mass screening programs to identify drug users or or disease carriers (bearers of AIDS, acquired immune deficiency syndrome, for instance). Some testing programs might violate constitutional provisions regarding due process, unreasonable search and seizure, privacy, and equal protection.

Genetic testing in the workplace is still in its infancy, but is expected to become increasingly prevalent. Its potential- and the possibilities for misuse - have already set off considerable public debate.

All aspects of law enforcement and criminal justice have been profoundly transformed by technological advances, starting a decade ago. At the core of the transformation are computerized databases and telecommunication networks. But forensic science and social science are also contributing greatly.

Social science methods of statistical analysis, computer models, simulation, and artificial intelligence expert systems are being used to predict criminal behavior and recidivism, to target enforcement resources and to decide about bail, jury selection, sentencing, and probation. These uses raise questions about possible violations of Sixth Amendment guarantees of a trial by an impartial jury of peers and Eighth Amendment prohibitions on cruel and unusual punishment and excessive bail fines.