NEWSLETTER
California Association of Criminalists

January 1987

Also included with this mailing:

1. Minutes of the October 10, 1986 Business Meeting
2. Minutes of the October 8, 1986, Board of Directors Meeting
3. Annual salary survey
4. Abstracts of technical papers from the Palm Springs seminar, October 9-11, 1986
5. Awards Committee request for nominations
6. Survey from the CAC's representatives to the California Criminalistics Institute Advisory Board

CONFERENCES AND SEMINARS

TECHNIQUES OF FACIAL SCULPTURE OF THE SKULL

February 22-25, 1987
The University of South Alabama in sponsoring a course by Betty Pat Gatliff on facial sculpturing techniques. The cost of the course is $500.00. For further information on this course, contact Dr. Ed Waldrip, Department of Pathology, University of South Alabama, College of Medicine, 2451 Fillingim Street, Mobile AL 36617. (205) 471-7780.

AMERICAN ACADEMY OF FORENSIC SCIENCES-ANNUAL MEETING

February 16-21, 1987
The Annual Meeting of AAFS will be held in San Diego, CA, at the Town & County Hotel. For further information, contact American Academy of Forensic Sciences, 225 S. Academy Blvd., Colorado Springs, CO 80910. (303) 596-6006.

CALIFORNIA ASSOCIATION OF CRIMINALISTS-SPRING SEMINAR

May 13-17, 1987
The Spring, 1987, semi-anual seminar of the CAC will be held May 13-17 in Reno, Nevada.

ELECTROPHORESIS SOCIETY-AMERICAS' BRANCH ANNUAL MEETING

June 23-26, 1987
The annual meeting of the Americas' Branch of the Electrophoresis Society will be held in San Francisco, CA, June 23-26, 1987. Call for papers on electrophoresis and applications. Plenary Sessions include: Nucleic Acids, Immunodetection, Forensics, Electroporation and cell fusion, Clinical diagnosis, and agriculture. For further information, contact Electrophoresis Society, P.O. Box 956, Mt. Pleasant SC 29464.

INTERNATIONAL ASSOCIATION OF FORENSIC TOXICOLOGISTS

July 1987
The 8th Triennial meeting will be held in Banff, Alberta, Canada. For further information, contact N. Dunnett, Home Office Forensic Science Laboratory, Aldermaston, Berkshire, RG7 4PN, UK.

INTERNATIONAL ASSOCIATION OF FORENSIC SCIENCES

August 2 - 7, 1987
Vancouver, British Columbia, Canada. Contact International Association of Forensic Sciences, 801-750 Jervis Street, Vancouver, B.C., Canada V6E 2A9. 604-681-5226.

THE THIRD INTERNATIONAL MEETING OF THE PAN AMERICAN ASSOCIATION OF FORENSIC SCIENCES

August 10-14, 1987.
The conference will be held at the Holiday Inn Plaza, Wichita, KS. For further information, contact Dr. William G. Eckert, P.O. Box 8282, Wichita KS 67208.

THE FIRST WORLD MEETING OF POLICE SURGEONS AND MEDICAL OFFICERS

August 10-14, 1986
The purpose of this conference, meeting concurrently with the Pan American Association of Forensic Sciences, is to discuss and compare the medical aspects of law enforcement and policing in various countries of the world.

CALIFORNIA ASSOCIATION OF CRIMINALISTS-FALL SEMINAR

October, 1987
The Fall, 1987, semi-annual seminar of the CAC will be held in Laguna Beach, CA.

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40TH ANNUAL MEETING OF THE AMERICAN ACADEMY OF FORENSIC SCIENCES
February 15-20, 1988.
This confernce will be held at the Wyndham Franklin Plaza, Philadelphia, PA. Contact AAFS, 225 South Academy Blvd., Colorado Springs, CO, 80910. (303) 596-6006.

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

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NOMINATIONS FOR CAC BOARD OF DIRECTORS

Nominations for the CAC Board of Directors are now being solicited by the nominating committee. The willingness of members to serve on the Board of Directors is essential. When members of the nominating committee call you, please cooperate with them by being willing to serve on the Board and encouraging your colleagues to do likewise. The members of the nominating committee are:

Lisa Brewer - DOJ Salinas
Dan Gammie - Orange County S.O.
Don Jones - San Bernardino County S.O.
Mark Moriyama - Santa Clara County
Karen Sheldon - Chairperson - Contra Costa County S.O.

The following positions will be up for election at the Spring Seminar, 1987:

President - Elect
Regional Director - South
Treasurer
Editorial Secretary

A brief description of the duties of each of these officers follows:

President - Elect/ President: The President is the chief executive officer of the Association and presides at all meetings of members and the Board of Directors. The President has general charge of the Associations business and executes, in the name of the Association, all deeds, bonds, contracts ad other obligations authorized by the Board of Directors.

The President-Elect performs all duties of the President in case of the absence or disability of the President, and shall perform other duties as assigned

The term of office is 3 years, to be served as one year as President - Elect, one year as President, and one year as Immediate Past President. It is recommended that nominees for this office have prior experience as a member of the Board of Directors.

Regional Director - South: The Regional Director-South is responsible or the assignment nd direction of the regional meetings in their region. They are also responsible for other duties as assigned by the Board of Directors. The southern region is defined as southern California, southern Nevada, Arizona, New Mexico and Texas. The term of office is two years.

Editorial Secretary: The Editorial Secretary edits and publishes quarterly the Association Newsletter and acts as the editorial liaison between the Association and Journal of Forensic Science

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by the Board of Directors.

(nominations continued from page 2)

Society (Official Journal of the Association by receiving nd delivering papers to the Journal for publication. The Editorial Secretary also edits and transmits the proceedings of the Semi-annual seminars (seminar abstracts) to the Journal for publication. The term of office is two years.

Treasurer: The Treasurer receives and safely keeps the funds of the Association and makes deposits of these funds into a bank(s) as designated by the Board of Directors. The term of office is two years.

These descriptions are excerpted from the CAC By-Laws. A more detailed description of duties can be obtained from the CAC Policy and Duty Statement Manual available from the Association or by contacting a member of the Nominating Committee.

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CAC AWARDS

Paul Kirk Award

Eric Parsons was selected as recipient of the 1986 Paul Kirk Award, awarded to a member with less than three years experience in the field of criminalistics who has made outstanding contributions to the profession. Eric has been employed by the Sacramento County District Attorney's Office Criminalistic's Laboratory where he has done research on the Intoxilyzer 5000. The results of his research have been presented at CAC seminars. In addition, he is being recognized for his initiative in securing private corporation support for instrumentation for his laboratory.

In addition to the $100 award, Eric will be attending the American Academy of Forensic Sciences meeting in San Diego in February where he will present a poster paper titled "A Comparative Study of Blood and Breath Analysis with the Intoxilyzer 5000." He will also be the recipient of the AFS General Section's Regional Award for 1987.

Outstanding Presentation

Loren Sugarman recieves this award for his paper "The Concentration and Isolation of Gunshot Residues for Particle Analysis" at the Fall seminar in Palm Springs. Loren will be presented with a $100 stipend at the Spring, 1987, CAC meeting in Reno.

Nominations for the Distinguished Member Award are open from January 1-31, 1987. Members are encouraged to make nominations based on the following guidelines:

1. The candidate must be a CAC member (in any status) at the time on nomination.

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(Awards, continue from page 3)

2. The candidate shall have contributed significantly to the Association in one or more of the following areas:

   a. Long term service to the Association as a member of the Board or a committee.

   b. Sustained production of papers or technical notes in newsletters or at seminars

   c. Organization of study groups or workshops, etc.

   d. Significant research and dissemination of the information to the forensic science community

   e. Any other unusual or significant contribution to the improvement of the profession of criminalistics

See the enclosure with this Newsletter for more information and a nomination form.

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CAC and BFS TO SPONSOR

CONGRESS OF CRIMINALISTS

on

SEROLOGY

Recently, the California Association of Criminalists and the California Department of Justice, Bureau of Forensic Services (BFS) agreed on joint sponsorship of a Serology Congress of Criminalists (COC). This event will help define the current state of the art of forensic serology by seeking contributions from leading serologists throughout the State.

This COC will present the findings of five work groups who will research and draft statements in five critical areas:

1. Quality Assurance
2. Standards of Training
3. Evidence Handling and Preservation
4. Methodology
5. Interpretation of Results

The work groups comprise scientists from the full range of forensic laboratories in California. The work products will include a thorough review of each on four elements:

a. Detailed Identification of Issues
b. Parts/Elements of Each Issue (State-of-the-Art)
c. Detailed Proposed Solutions with Alternatives (i.e. Survey Laboratories to Include Present State of Affairs)
d. Preferred/Recommended Solutions

Each group will have a member of the BFS Serology Technical Advisory Group (TAG) serving as group coordinator/discussion leader. At the COC to be held April 22-24, 1987, in Sacramento, each of the five study groups will present their findings, lead panel discussions, and report back to the audience on areas where consensus was or was not reached. Afterward, BFS will publish the proceedings and distribute it to all in attendance.

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of the five areas listed above focussing

(Congress of Criminalists - continued from page 4)

The published proceedings will provide an important citable reference which could be used to rehabilitate some of the confidence that has been lost in the field of forensic serology. Participation by various scientists will help to restore the acceptance of forensic serology by our courts.

The members of the various work groups are:

a. Quality Assurance

Linda Hartstrom - BFS - Riverside
Mary Gibbons - Oakland Police Department
George Sensabaugh - UC- Berkeley
Rob Stoinoff - Santa Ana Police Department
Meridee Smith - Sacramento County Crime Laboratory

b. Standards of Training

Steve Scott - BFS Sacramento
Jim White - Orange County
Eston Schwecke - Huntington Beach Police Department
Jim Streeter - BFS Sacramento
Greg Matheson - Los Angeles Police Department

c. Evidence Handling and Presentation

Tom Keener - BFS - Stockton
Ed Blake - Forensic Science Assoicates
Dan Gregonis - San Bernardino County
Mary Graves - Orange County
Jim Anderson - Los Angeles Police Department

d. Methodology

Rod Andrus - BFS - Fresno
Brian Wraxall - Serological Research Institute
Keith Inman - Forensic Science Services of Calif.
Terry Spear - Alameda County
Gary Sims - Institute of Forensic Science

e. Reporting and Interpretation of Resul

Mike Waller - BFS-Santa Rosa
Jan Bashinski - Oakland Police Department
Dorthey Northey - Contra Costa County
Carol Rhodes - California Laboratory for Forensic Science
Sam Le - Los Angeles Police Department

Should additional clarification be required contact and of the above individuals or Lou Maucieri, DOJ-Scaramento, at (916) 739-5484.

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NOTICE OF PROPOSED CHANGE

in the

ASCLD-LAB ACCREDITATION MANUAL

The ASCLD-LAB Accreditation Manual is silent on the subject of what action, if any, can be taken if a laboratory fails to comply with the Standards once it has been accredited. This could potentially result in laboratories not following through with compliance required by the Accreditation Board as a condition of their accredititation in the first place. it also leaves open the possibility of new applicants to be held to a different and much higher standard of performance than that being practiced by already accredited laboratories.

To clarify this point, the ASCLD-LAB proposes to add the following paragraph to the ASCLD-LAB Accreditation Manual. As this may be considered a substantive change, the proposal will be submitted by mail to the Delegate Assembly for ratification, as required in the ASCLD-LAB By-Laws. The By-Laws also require that proposed changes be published in advance of the mail ballot, to allow for input on the issues from the profession at large.

Proposed amendment to page 9, Accreditation Time Length, paragraph 2:

> "It is expected that a laboratory will continue to meet the Standards under which it was accredited for the five year duration of the accreditation period. Substantive allegation of non-compliance regarding an accredited laboratory will be addressed by the Board on a case by case basis. Demonstrated persistant non-compliance with an Essential Standard may be grounds for withdrawal of accreditation by the Board."

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CONTRIBUTIONS FROM THE NORTHWEST

Abstracts of articles appearing in the Newsletter of the Northwest Association of Forensic Scientists

Ion Pairing Extractions
Marshall, Bill, Washington State Toxicology Lab, NWAFS NEWSLETTER 12(1):7 March 1986

The use of ion-pairing of drug salts with various chlorinated solvents, either by column chromatography or simple extraction, can provide separations that are not possible with acid/base extractions.

Extraction of Heroin by "Panning" Technique
Mong, Gary, Washington State Patrol Crime Lab, Kennewick, NWAFS NEWSLETTER 12(1):8 March 1986

This procedure outlined in the newsletter will afford reasonably pure white to off-white heroin base from "brown tar" materials. This extraction method offers several advantages over other methods in current use.

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(NWAFS Abstracts -
continued from page 6)

Cocaine-Cobalt Thiocyanate Complex
Baker, Wally, Idaho State Crime Laboratory, NWAFS NEWSLETTER 12(1):9 March 1986

Cocaine is easily cleaned up for infrared identification using cobalt thiocyanate as a complexing agent. It separates cocaine even in the presence of other "caines". The method is described in the article.

Amine Derivatives Using PIT
Baker, Wally, Idaho State Crime Laboratory ,NWAFS NEWSLETTER 12(1)9 March 1986

Amphetamine, methamphetamine, as well as other primary and secondary amines, form derivatives with phenylisothicyanate (PIT) that provide clean, sharp infrared spectra for identification. The method for extraction and derivatization is described.

Simple Methamphetamine Clean-Up for Crystal Tests
Ely, Roger, Washington State Patrol Laboratory, Kelso, NWAFS NEWSLETTER 12(1):9 MARCH 1986

Recently this laboratory has been encountering exhibits described as "peanut butter crank" containing methamphetamine in a pungent, brownish, oily crystalline form. It is suspected that the material gets its color and properties from reaction products present with the finished product. The identification of methamphetamine using gold chloride in phosphoric acid proceeds without any problems. However, the identification of methamphetamine using picric acid fails to yield the typical "envelope" shaped crystals from the oily globs, even on standing. It was found that the procedure described in the newsletter produces a clean enough sample to quickly form the "envelope" crystals with picric acid.

Stippling in Mold Used In Identification
Staff of Washington State Patrol Crime Lab, NWAFS NEWSLETTER, 12(1):10 MARCH 1986

A rather poor partial shoeprint was matched to a suspect shoe because in the shoeprint was an area of the shoe sole that has a stippled pattern. The stippling pattern in most molds is made by hand by a skilled craftsman. Therefore, each mold presumably has unique features. In this case, both the stippling pattern and the amount of wear was consistent with the suspect's shoe. See William Bodziak, "Manufacturing Processes for Athletic Shoe Outsoles and Their Significance in the Examination of Footwear Impression Evidence", JFS, 31(1):153

Mikrosil Casting of Cartridge Cases
Baker, Wally, Idaho State Crime Laboratory, Boise,NWAFS NEWSLETTER, 12(1):10 March 1986

Frequently, when comparing cartridge cases, Mirosil casts are made of the firing pin impressions in order to better observe the detail present on the nose of the firing pin. Often, the casting material does not flow completely into the impression, and several attempts are required before an acceptable cast is obtained. I have found that thinning the Mikrosil with petroleum either in a disposable beaker before adding the hardener, allows the casting material to flow more freely into the impression. The thinned Mikrosil is spread on a file card, mixed with the hardener and the case heads are pressed into this mixture. After the Mikrosil sets up, the cases are removed and the casts (with proper backing still attached) are cut out with a cork borer of and appropriate size. The cast is glued on a #3 cork with identifying marks. The casts are easily manipulated under the scope using the standard cartridge case holders.

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(NWAFS Abstracts -
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Shelf Paper Used to Recover Post Mortem Prints

Ely, Roger, NWAFS NEWSLETTER 12(1):10, March 1986

The importance of gathering fingerprints of deceased victim at the time of autopsy cannot be overstated. The prints may be used for identification, but are also crucial for elimination of the victim from questioned prints. While most agencies collect post mortem fingerprints routinely, the collection of palm prints seems to be infrequent. Many times, the reason for not collecting palm prints has been the lack of a suitable method and procedure to insure quality impressions. The use of self-sticking shelf paper (found at most grocery or hardware stores) is an easy method to use to collect post mortem palm and fingerprints. Materials used and method are explained in article.

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URINE SCREENING PROGRAMS FOR CRIME LABORATORY PERSONNEL

At the Fall meeting of the Northwest Association of Forensic Scientists, a panel discussion, "To pee or not to pee", debated the role of urine drug screening programs for crime laboratory personnel. The members of this panel (Wally Baker, Rocky Mink, Bob Sager, Wayne Jeffrey, Diane Tappen) discussed many qustions, but few answers were available. Some troubling information came to light concerning the experience of Federal employees with urine screening programs which were hastily implemented with inadequate safeguards.

In response to a suggestion from Ann Bradley that NWAFS propose some guidelines for a workable urine screening program, she was appointed chairman of a committee to draft such guidelines. If anyone can contribute references to existing screening programs, especially those for forensic lab personnel or law enforcement agencies, they should send that information to

Ann Bradley
Idaho Department of Public Safety
Bureau of Laboratories
Forensic Section
2220 Old Penitentiary Road
Bosie ID 83712
(208) 334-2231

ST. THENEW - A PATRON SAINT FOR FORENSIC SEROLOGY

George F. Sensabaugh
Forensic Science Group
School of Public Health
University of California, Berkeley

Many people believe that every human endeavor should have a patron saint. To my knowledge, no area of forensic science has claimed a saint although St. Jude would be an obvious candidate. While traveling in Scotland this past year, I became aware of another saint who, through her travail, might be considered a candidate for the patron saint of forensic serology.

St. Thenew was venerated in medieval Scotland. She was the daughter of Loth, King of the Lothians. Refusing to enter into an arranged marriage, she was cast out of her father's house and became a swineherd. Her suitor pursued and raped her. She became pregnant and when the pregnancy became evident, her father ordered her killed. She was thrown off a mountain but miraculously survived. Her father's executioners tried again, setting Thenew adrift in a boat without oars or rudder on the Firth of Forth. The boat was miraculously guided to dry land by shoals of fishes. There she gave birth to her child, Kentigern, who later as St. Mungo became the patron saint of the city of Glasgow.

St. Thenew is thus Scotland's first recorded rape victim, battered woman, and mother who could demand paternity testing. Since the objective of forensic serology is to help the St. Thenews of the world, patron sainthood would be appropiate.

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FUMES KILL SPEED MAKERS

(reprinted from
New Scientist,
16 October 1986)

Three people have been killed in Los Angeles after being overcome by fumes while making methamphetamine, an illicit drug commonly known as "speed" or "poor man's cocaine". The way the people died has surprised narcotics agents in Los Angeles Police Department.

Clandestine drug laboratories producing methamphetamine are booming in California (New Scientist, 25 September, p 20). Of the 141 laboratories raided in the first six months of this year, 117 were making methamphetamine. It has a street value of almost $30,000 a kilogram.

But until last weekend, narcotics agents in Los Angeles -one of the main drug centres in the US- had no record of any deaths resulting from the manufactur of methamphetamine.

In the past, the hallucinogen phencyclidine has been the most dangerous drug to make. Two people died when they spilled acid on cyanide and produced cyanide gas. Another five have died from explosions or fires caused by the highly inflammable ethers used in its manufacture. Many more have been injured.

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"We believe the three people died a slow, painful death," says Roy Wunderlich, a detective with the police's narcotics branch. "It appears they began cooking the chemicals at 3 am on Saturday morning and died about 24 hours later" Two men and one woman died. A 22 year old man who allegedly provided the chemicals has been arrested.

The laboratory was in a bedroom. The chemicals being heated were hydriodic acid, ephedrine and red phosphorus. The mixture needs to be cooled. Normally, glass tubing is used, but the three people who died were using a plastic garden hose to draw water from a bathroom. Police believe that the hot hydriodic acid melted the plastic. The reaction is believed to have produced a toxic gas that filled the poorly ventilated house.

The police confiscated receipts for the chemicals. Murder charges may also be laid against the company that supplied the chemicals. It is illegal in California to sell certain chemicals to buyers without first informing the Department of Justice who the buyer is, the quantity requested, and what it will be used for.

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CALIFORNIA STUDENTS MAKE DRUGS IN THE LAB

(reprinted from
New Scientist,
25 September 1986)

Clandestine drug laboratories are booming in California, the centre of the manufacture of "designer drugs" in the U.S. So far this year, equipment in 250 laboratories has been seized, and universities and research laboratories are being warned to watch out for the illicit use of a wide range of chemicals.

Chemists- some sophisticated, but most rank amateurs-are mixing common chemicals and their derivatives to produce a vast range of illicit drugs. In the process they are endangering their own lives and the lives of people around them since any of the concoctions are volatile and liable to explode. A fire or explosion is often the reason why anti-drug squads first come to hear about the existence of clandestine laboratories.

The three main drugs being manufactured are methamphetamine, also known as speed, fentanyl, a potent analgesic, and phencyclidine (PCP).

A new sobering twist in Los Angeles is the attempt by some drug manufacturers to smuggle the hallucinogen PCP aboard commercial airliners bound for other cities. Los Angeles is the centre of PCP production in the U.S. PCP is largely composed of ethyl ether, a highly explosive and flammable liquid.

Clandestine laboratories are not new to the U.S, but they are growing at an alarming rate especially in California. It is a trend that is being hiddin by the clamour in Washington to rid the nation of cocaine and heroin, both drugs refined from plants and entering the US from Central America and South America.

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"It's just amazing to me that there's so much manufacturing of methamphetamines out there, and cocaine is seen as the big thing", says Robert Luca, the agent in charge of the state's drug enforcement office in San Jose. "Illicit manufacture of drugs through chemicals has never been greater than at the present time," says Robert S. Elsberg, from the State Bureau of Narcotic Enforcement in San Francisco.

Cocaine is still California's most popular hard drug. But methmphetamine- or the "poor man's cocaine"- is catching up and may surpass cocaine in popularity in about two years, according to the Bureau of Narcotic Enforcement. Price is one reason- it sells for about $1000 and ounce compared with $1500 and ounce for cocaine. Another reason is that the intensive campaign being waged in Washington is scaring people off cocaine.

No on knows how many laboratories there are in the US manufacturing illicit drugs, but one indicator is the number that are seized. A conservative estimate is that for every one seized, another two go unreported. Elsberg estimates that about 800 clandestine laboratories are operating in California at the moment. We cannot follow up all the leads we are getting," he said.

The number of laboratories seized in California jumped by 140 per cent from 1984 to 1985. In 1984, 312 laboratories were raided nationwide- 93 of them were in California.

By far the most common drug is methamphetamine, also known as "speed". It is a stimulant that was once confined to motorcycle gangs in the state. Ingestion is normally by "snorting" or swallowing. Of the 141 laboratories raided in the first six months of this year, 117 were producing methamphetamine. The average laboratory produced 12 kilograms a week with a street value of $300,000. One kilogram costs about $1000 to manufacture.

LSD, the psychedelic drug of the 60's is making a resurgence in California, mainly the the San Francisco area, but in a new form. In the 1960's it was eaten on a sugar cube. Today it is sold on perforated paper -the user tears off a small strip and licks it.

Another drug that is starting to reappear is fentanyl, a potent narcotic analgesic. In its purest form it is 3000 time stronger than morphine.

"Addicts say that if God made anything better he kept it for himself," ays Gary Henderson, a pharmacologist and toxicologist at the University of California at Davis. But it is highly dangerous for the occasional user, says Henderson.

"Addicts know how to administer it and they know the antidotes. They also use it in groups and can revive one another."

The drug- which has been confined largely to California and other western states- quickly went out of favour last year when 70 deaths from fentanyl overdoses were reported. Most of the deaths were white males in their 30's who were alone. In half of the cases alcohol was involved as well. One fatal overdose has been reported so far this year.

Henderson, who coined the term "designer drug" to describe fentanyl production, believes that one "world-class pharmaceutical chemist" is responsible for most of the 12 different analogues of fentanyl that have appeared in California since 1979. "He or she will probably never be caught," he said. In two weeks, said Henderson, the chemist could make 200 grams, enough to provide

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200 million doses. "It is possible that all the fentanyl we have seen could have been made 10 years ago."

Fentanyl is also manufactured commercially as an anaesthetic. "It is used in most operations in this country," Hendrson said, "Anaesthesiologists are using it as an illicit drug, but the numbers are small."

This year, 18 of the 21 PCP laboratories raided in California were in Los Angeles. "It is ridiculously easy to make," says Richard Bingle, chief forensic chemist with the Scientific Investigation Division of the Los Angeles Police Department. "All you need is a few five-gallon plastic buckets and a stirrer".

As a powder, PCP is often rolled with marijuana and smoked. In liquid form, the long thin cigarettes are dipped into the solution, dried, and then smoked. It is also "snorted". In its legal form, the drug is used by vets to tranquillise large animals. "It was never meant for humans and often leads to odd behaviour like dancing nude in the street," Elsberg said.

A crackdown on the availability of chemicals to make the drugs is leading to new centres of manufactur. Clandestine laboratories have been found in public toilets, motels, abandoned houses, cabins in remote areas, and even trucks travelling up and down the highway. But recently in Los Angeles, established laboratories in chemical companies and universities have been used. A graduate student at California State University has been arested for making methadone.

Earlier this month, at a meeting of the American Chemical Society in Anahiem, California, Bingle warned society members to notify the police if certain drugs were missing from their inventories. He distributed a list of the chemicals and solvents needed to make amphetamines, PCP, fentanyls, and methaqualone, a hypnotic. "If an employee shows up at midnight to get all the work done, he may well be making dope," he said.

California is in the middle of pasing a series of laws designed to curb clandestine drug laboratories. One law is in place and three others are awaiting the governor's signature after passing through the state's legislature.

Chemical manufacturers can not sell certain chemicals to buyers without first informing the Department of Justice who the recipient is, the quantity requested, and what it will be used for. But drug makers are finding ways around the law. They are either making the chemical precursors themselves or buying them in other states. Also, four of the 125 chemical companies in Los Angeles are said to be ignoring the law and supplying chemicals to clandestine laboratories.

Other measures will beef up the number of agents trained to investigate and prosecute clandestine laboratories, pay for the cost of prosecution and for the disposal of toxic wastes from laboratory sites, allow the seizure of property, and tighten the licensing of chemical companies and the sale of chemicals.

But Henderson says that laws are not the answer. "Laws governing heroin have been on the books since 1914 but the incidence of heroin abuse is about the same on a per capita basis. All societies use drugs and you will never outlaw their use. We have to better educate people on the appropriate use of drugs."

Henderson adds that the current campaign against drugs will lead to the development of more potent drugs that can be made quickly. "The supply will last longer. There are unlimited number of chemicals out there that can be used."

PEOPLE OF THE STATE OF MICHIGAN,
Plaintiff-Appelee,
v
JEFFREY ALLEN YOUNG,
Defendant-Appellant.

BEFORE THE ENTIRE BENCH (except Cavanagh and Archer, JJ.). LEVIN, J.

(The following excerpts from the appellate decision in the Young case are reprinted here for the information of the membership. In their decision, the court has outlined in detail what they see as the defects in the proof of reliability of electrophoretic analysis of bloodstains as it was presented in this case. Many sections of the opinion have been omitted, and all of the footnotes have been omitted.)

The question presented, in the words of the opinion of the Court on an earlier submission of this appeal, is whether "the results of serological electrophoresis [of dried evidentiary bloodstains] have achieved general scientific acceptance for reliability among impartial and disinterested experts" in the scientific community. We conclude that the people have not established such general scientific acceptance. . ..

We further held that "the results of the blood analyses were [not] admissible at trial without a prior showing that the technique of serological electrophoresis enjoys general scientific acceptance among impartial and disinterested experts. . .".

II

Evaluating the scientific community's acceptance of the reliability of electrophoresis of dried evidentiary bloodstains presents some unusual problems. The number of scientists not working for a police agency who are familiar with electrophoresis of evidentiary bloodstains is small. If these scientists alone were considered, the community would be too small for a fair sampling of scientific opinion. There is, however, a larger number of nonforensic scientists using electrophoresis who are capable of evaluating the reliability of electrophoresis of evidentiary bloodstains if presented with the information they need to fill the gaps in their own knowledge and experience. The two groups combined constitute a group of scientists large enough to make a fair determination of whether electrophoresis of evidentiary bloodstains is generally accepted by experts in the scientific community.

The prosecution has the burden of establishing this community's general acceptance of the reliability of electrophoresis of evidentiary bloodstains. In the instant case, there is disagreement within the community on three separate issues: the length of time that genetic markers, particularly erythrocyte acid phosphatase (EAP), can be accurately read in dried blood, the reliability of the thin-gel multisystem analysis, and the effects of crime-scene contaminants. The prosecution did not fulfill its burden respecting the last two issues raised by the defense.

The only prosecution witness having substantial experience with electrophoresis of evidentiary bloodstains relied on his own unpublished observations and an unpublished reliability study by the developer of the multisystem to conclude that the thin-gel multisystem analysis was reliable. A defense witness questioned both the reliability of the technique and the study. The other prosecution witnesses were unfamiliar with the thin-gel multisystem, and their conclusion about the reliability of the method was based on the absence of any study showing that it did not work. No inde-

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pendently conducted reliability study supported that conclusion. Another defense witness said that the scientific community would not agree on the reliability of that conclusion without better supporting evidence.

Nor have comprehensive control tests been run with respect to the effects of crime scene contaminants. Prosecution witnesses testified, on the basis of their experience with bloodstains drawn under laboratory conditions, that they can identify bacterial contamination, at least if it is of the type normally encountered. They also claimed that bacterial contamination has not affected the reliability of the electrophoresis tests they have conducted. This is, however, the type of self-verification considered inconclusive in the scientific community. The record does not indicate that any work has been done on the effects of soil and chemical contamination on the reliability of electrophoresis.

We conclude that the scientific community's general acceptance of the reliability of electrophoresis of evidentiary bloodstains has not been established in the instant case. Reliability remains in dispute and unresolved because of the questions unanswered. The questions are not likely to be answered and the reliability of electrophoresis of evidentiary bloodstains established until independently conducted validation studies on the thin-gel multisystem analysis are undertaken and comprehensive control tests evaluating the effects of different contaminants are run, and the results have been subjected to the scrutiny of the scientific community. The evidence produced by electrophoresis should, therefore, not have been admitted. . . .

IV

On the first submission of this appeal, this Court said that as "unanimous precedent unequivocally demonstrates, the party offering novel scientific evidence has the burden of demonstrating general scientific acceptance for reliability among impartial and disinterested experts before the evidence may be admitted."

The general acceptance rule is designed to "prevent the jury from relying on unproven and ultimately unsound scientific methods." It recognizes that jurors are "scarcely" prepared to evaluate "complicated, scientific testimony concerning the theory and operation of the devices in the face of a difference of scientific opinion as to their accuracy." Leaving the decision to disinterested and impartial experts in the scientific community assures that those best qualified to assess the reliability of a scientific method do so. Although requiring the technique to "attain sufficient currency and status to gain the general acceptance of the relevant scientific community" inevitably creates some delay in the admission of the type of proof supplied by a new technique, the delay is deemed necessary to assure that the technique trustworthy.

V

At the evidentiary hearing to determine the reliability of electrophoresis of evidentiary bloodstains, the prosecution presented seven witnesses, and the defense presented two witnesses. The prosecution and defense each presented one forensic scientist having substantial experience with electrophoresis of evidentiary bloodstains. Three of the prosecution's witnesses and the other defense witness were geneticists, familiar with electrophoresis, but unfamiliar with electrophoresis of evidentiary bloodstains. The other three prosecution witnesses were technicians, two of whom were full-time employees of law enforcement agencies. Before analyzing their conclusions it is first necessary to determine whether some or all of them are "disinterested and impartial experts in the particular field."

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Because a theoretical understanding is essential, the relevant scientific community is scientists not technicians. Practical experience with the process, however, is also necessary. Ideally the community would be scientists with direct empirical experience with the procedure in question.

Two of the witnesses fit this description. Dr. George Sensabaugh is an associate professor of public health at the University of California at Berkeley and a specialist in forensic science. He has also conducted electrophoresis studies of dried bloodstains. Dr. Benjamin Grunbaum is a retired biochemist from the University of California with a specialty in criminalistics, the science of identification of physical evidence in criminal cases. He has been recognized to be "a leader in the development of electrophoresis to test body-fluid enzymes for purposes of forensic identification."

Grunbaum and Sensabaugh appear to be a part of a small community of scientists doing work on electrophoresis of evidentiary bloodstains. The number of scientists within this community willing to testify seems even smaller. Grunbaum, Sensabaugh, and Mark Stolorow, the police detective who did the electrophoresis in the instant case, figure prominently in the few reported cases involving electrophoresis of evidentiary bloodstains. Those cases might be described as reflecting and reporting a debate between Stolorow and Grunbaum.

An argument could be made that neither Grunbaum nor Sensabaugh are disinterested and impartial, and should therefore be excluded despite their expertise. Grunbaum was the leader of the team of scientists that sought to develop a bloodstain analysis system for use in crime laboratories. He brought in Brian Wraxall and Stolorow to work on the project. After expressing dissatisfaction with the multisystem being developed, he withdrew from the project and suggested that it be discontinued. The project continued and when the results were published, he claimed they included misrepresentations. An independent review group found no grounds for Grunbaum's charges, but the sponsors of the project decided not to publish its results. Arguably, Grunbaum is still seeking to vindicate his original position. Sensabaugh also is not clearly disinterested. He has been a collaborator with Brian Wraxall and a paid consultant with the Oakland Crime Laboratory. He has also contributed to a prosecution response to an amicus curiae brief in a case pending before the California Supreme Court.

Nevertheless, a certain degree of "interest" must be tolerated if scientists familiar with the theory and practice of a new technique are to testify at all. The standard developed by this Court is whether the expert's "livelihood was not intimately connected with the new technique." The livelihood of Stolorow and James Kearney, the prosecution witness who direct the FBI serology laboratory, is intimately connected with the new technique. The livelihood of Grunbaum and Sensabaugh is not so intimately connected.

The community of scientists having direct empirical experience with electrophoresis of evidentiary bloodstains does not seem "sufficiently large so that the Frye objective of receiving a consensus judgment of the scientific community can be met." The community of nonforensic scientists using electrophoresis is, however, large enough to obtain an adequate sampling of scientific opinion. These scientists have sufficient theoretical understanding and practical experience to be able to evaluate the evidence. The geneticists testifying for the prosecution and the defense are therefore in the relevant community of scientists having experience with electrophoresis. They need only explain the gaps in their own know-

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ledge and experience, and reach general agreement about the reliability of the information they are using to fill these gaps, for their judgment to be respected.

agreement about the reliability of the information they are using to fill these gaps, for their judgment to be respected.

VI

The precise issue in the instant case is whether electrophoresis of evidentiary bloodstains passes the general acceptance test. General acceptance of electrophoresis in other areas is not necessarily relevant. The defendant concedes that serological electrophoresis of fresh blood in paternity testing and genetics research is considered generally reliable. Electrophoresis of evidentiary bloodstains presents, however, a number of complication, particularly the electrophoresis conducted in the instant case. The complications are the bloodstain is not fresh, it is tested by thin-gel multisystem analysis, and most importantly, it has possibly been exposed to unknown contaminants....

The defense raised the possibility of misreadings caused by the deterioration of aged blood. According to Dr. Grunbaum, blood degrades very rapidly. In the EAP system, the problem is said to be particularly acute, because the banding patterns for the B,C and CB types are similar. In the instant case, the sidewalk stain was typed B although originally the reading was inconclusive.

Despite these disagreements, if the only question about the reliability of electrophoresis of evidentiary bloodstains was the survivability of degraded samples, it would be questionable whether electrophoresis evidence should be excluded where the bloodstain is less than three weeks old. . . .

The second point of contention is the reliability of the thin-gel multisystem used in the instant case, which simultaneously analyzes three genetic markers, PGM, EsD, and GLO, on a single, thin-layer starch gel. . . .

A specific question raised is whether the filter paper used in the test of the EsD molecules has the unintended effect of compromising the analysis of the PGM and GLO molecules. Because the results of the GLO test were not interpretable in the instant case, the only issue is the reliability of the PGM results in the multisystem analysis.

The defense argues that the thin-gel multisystem is unreliable with respect to dried blood because the blood sample is too marginal to begin with to be accurately read after further diffusion. One the electrophoretic separation has been conducted, a filter paper containing a chemical reagent is placed over the gel. The filter paper is meant to stain the EsD molecules, but it also soaks up PGM molecules. Grunbaum says this "compromises" the PGM test because "the PGM molecules have diffused sideways, some have disappeared. . .[and] the intensity of the PGM bands are not the same as if they were stained first, before the EsD." Grunbaum said he could "deduce from the photographs (taken of the test) that a leaching out of the PGM has occurred and you can see it very well" in the instant case. The defense argues that the multisystem "aggravates" the problem inherent in analyzing degraded samples.

The defense further argues that no lity of the thin-gel multisystem has ever been published. No prosecution witness contradicted this argument. The developer of the thin-gel multisystem, Brian Wraxall, did conduct his own blind trials, but self-verification is not a sufficiently reliable procedure. . . .

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The prosecution also asked the scientists using the other combination tests why they believed the thin-gel multisystem was reliable. Their collective response could be summarized in the following comment by Dr. Racheal Fisher, "I have no reason to suppose it wouldn't work." They testified that they had seen no study demonstrating that the multisystem was unreliable. This line of reasoning would be adequate if the burden of establishing general acceptance of unreliability were placed on the defense. The burden of establishing general acceptance of reliability is, however, on the prosecution.

In sum, there are substantial unanswered questions respecting the reliability of Wraxall's thin-gel multisystem. Conflicting expert testimony indicates that until independent verification tests have been conducted regarding the thin-gel multisystem, general agreement in the scientific community on the reliability of that multisystem is unlikely. A specific question left unresolved is whether the filter used in the test of the EsD molecules compromises the analysis of the PGM molecules.

C

The reliability of blood degraded by dirt, gasoline, urine, sweat, and other possible crime scene contaminants is also at issue in the instant case. Electrophoresis for paternity testing and genetics research is not beset with these problems. The only scientists that have done electrophoresis of blood exposed to these contaminants are those with forensic experience.

Both witnesses for the defense, Grunbaum and Dr. Diane Juricek, testified that it is not possible to determine the reliability of electrophoresis of evidentiary bloodstains until the effects of crime scene contaminants are understood. Juricek said, ". . .the effects of crime scene contaminants which appear on sidewalks, DDT, which can, you know, from spraying grass. . . . There is (sic) also bacterial contamination possibilities. There are molds that could have an effect." Although Juricek would not say for certain whether the contaminants would affect the electrophoresis, she said there was a "very strong theoretical possiblity" that they would. Grunbaum testified "(t)here is just no way of knowing the degree of. . . the humidity, . . . heat. . . bacterial. . . (and), chemical contamination, and. . . this is a range that goes on beyond anybody's imagination."

Both witnesses testified that the reliability of electrophoresis of evidentiary bloodstains would not be established in the scientific community until controlled studies were conducted taking into account possible contaminants present at a crime scene. Juricek said, "(y)ou would have to check all these different factors. . . singularly and then in combination. . .". The studies would then have to be published and "verified independently."

It appears from the record and a survey of the scientific literature that such comprehensive control studies have not been conducted.

The prosecution relies instead on inferences drawn from tests performed on dried bloodstains prepared under ideal contamination-free conditions. The only publication referred to by name was the Denault study discussed earlier. Reliance on this study is curious given Denault's own caveat.

> "(E)mphasis must be placed on the limitations of this study. It is intended as a starting point for future research. ....Moreover, the tests were conducted on clean specimens free of impurities. It is

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> realized that in actual practice serological evidence preserved under known and constant conditions is rare, and the specimens may be contaminated with impurities such as perspiration, urine, soil, and bacteria. These factors limit the application of the results of the study."

When questioned about the proviso, the prosecution's only expert with significant experience with evidentiary bloodstains commented, "the cleanliness of the stains is not as significant a problem as they think it is." The prosecution emphasizes that no study has shown reliability.

Prosecution witnesses testified about their experience with contaminants. Sensabaugh, relying on his won unpublished laboratory study, said that bacterial contamination would signal itself. He said the person interpreting the test would see "new bands appearing in odd positions. . .". Fisher also testified that bacterial contamination would result in a "different activity, different position." She suggested the contamination "will flag you. . .".

In sum, scientists do not agree what effect common crime scene contaminants may have on electrophoresis. They do not agree because comprehensive control tests have not been undertaken. The scientists testifying at a trial had no experience with soil or chemical contamination and could only guess what effect such contaminants might engender. Although the scientists had some experience with the type of bacterial contamination found in laboratories, the bloodstains here were made during or following the commission of a crime and not under laboratory conditions.

VII

General agreement in the scientific community on the reliability of electrophoresis of evidentiary bloodstains has not been achieved because independently conducted validation tests and control studies have not been undertaken, and the results subjected to the scrutiny of the scientific community. Legal commentators have spoken of the need for comprehensive testing to establish the reliability of a new technique.

The scientific tradition expects independent verification of new procedures. When other scientists analyse and repeat, they counteract the dangers of biased reporting. It is scientists not responsible for the original research that confirm its validity.

Although electrophoresis has been generally accepted as reliable in the scientific community for many years, Wraxall's multisystem test is a new technique. No independently conducted verification studies have been undertaken. Scientists evaluating the technique necessarily base their conclusions on the unpublished reliability study conducted by the multisystem's developer. General agreement in the scientific community cannot be achieved on the basis of this type of testing alone. Independently conducted reliability tests on Wraxall's multisystem could, however, be undertaken without great difficulty. Such questions as whether the filter compromises the subsequent tests would seem to be readily resolvable through independent verification.

The absence of control studies measuring the effects of various contaminants on electrophoresis also stands in the way of general agreement in the scientific community. Although it is clearly not possible or necessary to measure every conceivable contaminant in the environment, or at least every contaminant a defense attorney can imagine, the effects of certain common contaminants such as soil and gasoline could

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and should be tested. According to the record, their effect is presently unknown. It is not clear whether they alter or remove bands and thereby destroy the reliability of the test or whether they just render the results uninterpretable or create an easily identifiable stray band.

The dangers of allowing implementation of the inadequately tested device are well-known. The paraffin test was used by law enforcement agencies and introducd as evidence in court to establish that a suspect has recently fired a gun. "The theory behind the test was that the results established the presence of particles of nitrates... deposited on the hand by the gases of a discharged cartridge." It was not until 1967, over thirty years after the test was accepted as a reliable evidence in court, that the first comprehensive study was published conclusively showing "that many people who never fired a gun but whose profession, occupation, or happenstance brought them in contact with nitrates can be expected to yield positive reactions to the test."

The history of the Dalkon Shield is also instructive. "With adequate testing, controlled studies and cautious marketing, (the manufacturer) could have discovered the increased risks which have been shown to be inherent in the Dalkon Shield's unique new design." Instead, because of its desire to get the new product on the market as quickly as possible, "(t)he defendant relied entirely on (the researcher), who had not only the pride of invention, but also a personal incentive to bias his judgment...."

"Do you swear to tell the truth, the whole truth, and nothing but the truth, and not in some sneaky relativistic way?"

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