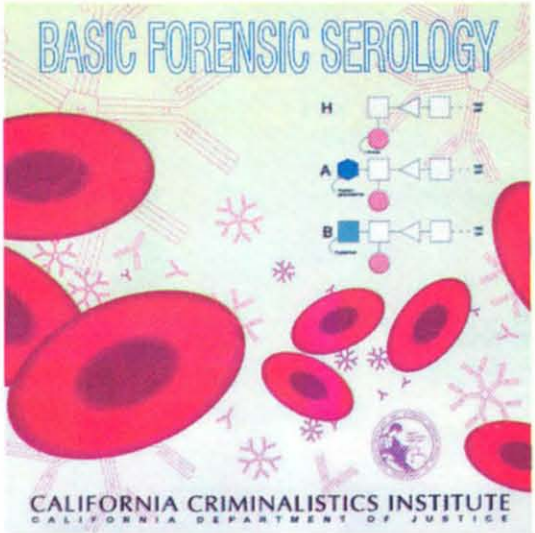
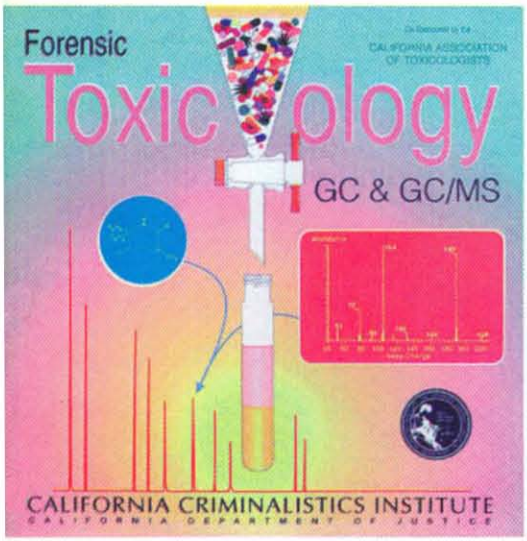
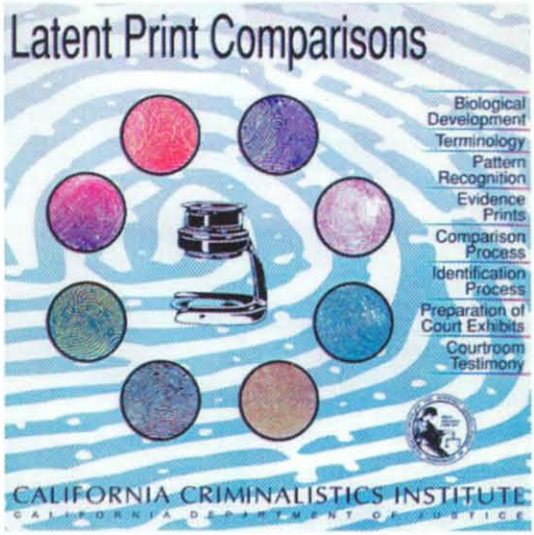
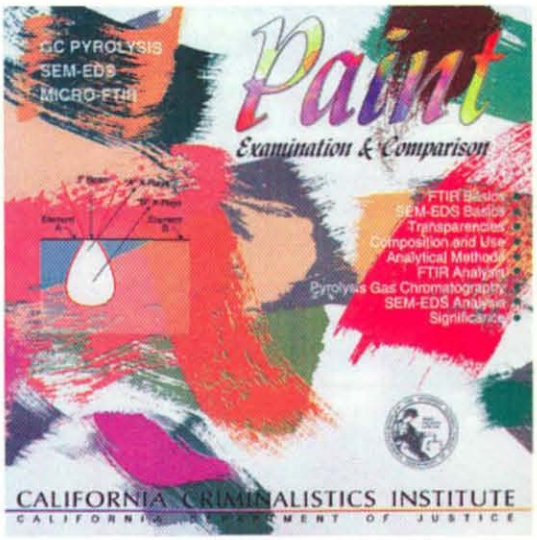
The CAC News

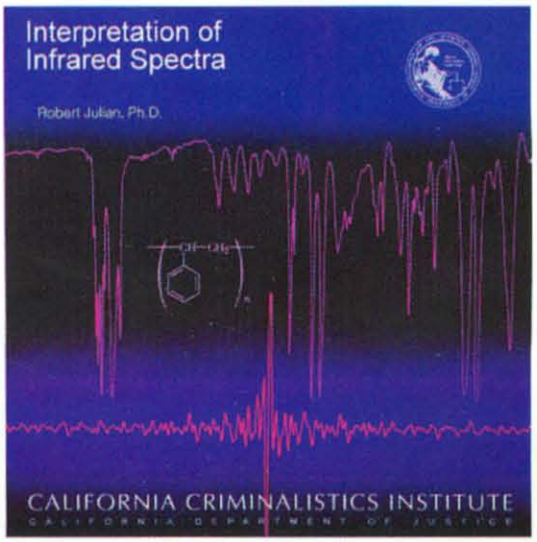
News of the California Association of Criminalists • Spring 1997











The California Criminalistics Institute

The President's Desk

Pete Barnett

The Question of Why

My three previous messages as CAC President have dealt with the subject of what we are about as criminalists, and how we can take actions as individuals and as members of professional organizations to enhance our technical competence and promote our professional credibility. In my final column, I would like to address the question of why. Why should we take certification examinations, have our labs accredited, join professional organizations, run for offices in these organizations, or chair committees? Why should we expect our laboratory managers and agency heads to fund travel to professional meetings, give us time to prepare articles for newsletters or journals, or leave work a little early occupationally to travel to a CAC dinner meeting a two hour drive away?

Why? In a word, "credibility." Can anyone seriously argue, after such spectacles as Fred Zain, the Birmingham Six, O.J. Simpson, the recent FBI Laboratory publicity, and nearly weekly revelations of people being released from prison after serving years for crimes they did not commit, that the criminal justice system, and the scientists who work in it, are under increased scrutiny? How can we ask our clients and the public to take us seriously, to give us the credibility and responsibility that we think we deserve, if we do not require of ourselves a standard of peer review and demonstrated professional competence. Credibility is a quality that is earned by any profession and its practitioners over a long period of time. It comes from a generally demonstrated competence by the practitioners combined with a tradition of excellence and competent delivery of professional services.

Nearly a quarter century ago, the profession failed to address problems in the credibility of blood alcohol testing. A simple solution like doing duplicate tests was treated as an insurmountable problem by portions of the profession, and as a consequence the profession could never agree upon a protocol for blood alcohol testing. The solution was a governmental regulation which, most would agree, is highly cumbersome, unnecessarily complex, and rather expensive.

Have we learned a lesson from blood alcohol testing regulation? Perhaps. In California, many laboratories are accredited, and the ones that are not are working on it. In California, quite a few criminalists are certified. In some laboratories, notably Oakland, Fresno (DOJ and Sheriff's office) a majority of the criminalists have taken ABC Certification examinations. On the other hand, we have not seen a general rush of

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California Association of Criminalists

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On the cover...
Our very first full color cover features the artwork of Stan Brown. Each example is from the covers of printed course material distributed to students enrolled at the CCI. See related story.

The CACNews is published four times a year (January, April, July, and October) by the California Association of Criminalists, a non-profit professional society dedicated to the furtherance of forensic science in both the public and private sectors. Please direct editorial correspondence to the Editorial Secretary.

Spring 1997

Contents

Carol Hunter "Retires" as Cal Lab Closes

After twenty one years as a criminalist, the last fourteen as owner of the California Laboratory of Forensic Science or "Cal Lab", I have decided to retire from my profession of criminalistics. This decision comes after a heart and soul searching process. I never thought that I would do anything else in my career **but** criminalistics. But the evolution of my private practice was away from bench laboratory analyses toward an exceptionally heavy concentration in consultation without analyses. This in and of itself is not necessarily bad, however, consulting/critiquing is not the reason that I entered into criminalistics. My love of forensic science will never cease to exist.

When I began as a criminalist in Ohio in 1976, I sure was naive! (Just ask Pete Barnett) Who the heck were these private criminalists anyway? And, why did they play a role in our profession? My early friendship with Pete must have been a foreshadowing of my future.

During my early days, the federal government had poured millions of dollars into LEAA grants to improve the quality and quantity of crime laboratories. The laboratory I worked at was founded with these funds, and all of my early McCrone microscopy and forensic serology training was funded by LEAA as well, I was well on my way as a generalist!

Casework involved analyses on evidence from residential and commercial burglaries; vandalism and "turfing"; hit and run auto accidents; wildlife trapping and snaring out of season; vehicular manslaughter; rapes; and, of course, homicides. Those analyses ranged from toolmarks, shoeprints, plant identification, soil comparisons, paint comparisons, animal and human hair comparisons, SAE analyses to genetic marker analyses along with crime scene processing and vehicle exams. To me, this was one of the most interesting and exciting times in my career.

I founded Cal Lab in 1983. It was a private consulting company offering a wide range of analyses and consulting services including forensic serology, microscopy, GSR analysis, fire debris analysis, shoe and tire track comparisons crime scene processing / reconstruction / evaluation and consultation in each of these areas. We performed reanalyses and first time testing; we were retained by the prosecution and defense in criminal cases, and also worked on civil cases. In other words, we came to work every day and performed the same job that each of the government lab criminalists do!

The CAC became an extremely important part of my professional career. I cannot express strongly enough the benefits I have personally gained through ongoing involvement in this organization. Upon hearing of my retirement, a colleague asked me, "You know, over the years and still today you gave so much time to the CAC; maybe you should give less time so that you have more time for Cal Lab." Active participation in the CAC was an integral part of my professional career and I would not take back one moment of the time I have given and still give to this organization.

But there is more about Cal Lab and private practice in general. A private practice must financially support its employees and the principals. It is an independent laboratory that reviews work of other laboratories. It is a group of criminalists pursuing the same professional career as all of you. It is a subset of criminalists constantly harangued as "the bad guys", "the black hat", "defense criminalists"; need I go on? Although many of our colleagues would also admit that there is a need for the oversight review process offered by the private forensic laboratories, gaining and maintaining one's respect was an ongoing and sometimes agonizing process. I often wondered if the government lab criminalists scrutinized each other so sharply.

During these 14 years of private consulting, there certainly have been many changes in criminalistics. Crime lab accreditation (ASCLD-LAB), analyst certification (ABC), DNA, TWGDAM, TWGMAT, court decisions, just to name a few. What pearls of wisdom can I pass on to each of you, especially the new members of our profession? To embrace criminalistics as your profession; to choose to dedicate a portion of your life toward your own professional development. This may be through active participation in a professional organization like the CAC. Or it may be through training development on your own time. Do not wait for a colleague, an immediate supervisor or your laboratory director to direct your career, you must do this by yourself. Although in a perfect world, the lab director should be giving 100% support to training programs, equipment purchases, etc., you probably have already figured out that just isn't the case.

Don't count on compliments to fulfill your sense of accomplishment. Now more than ever it is important to maintain a high job commitment if for no other reason but to give yourself a greater sense of self. It is really in your best interests if you continue a high job commitment. And, as a result, you will be more productive and benefit those individuals relying on your work product. *"Commitment is a gift you should give to yourself."*

NOW, where am I going? What am I going to do? I'm headed into an entirely new profession and will still be in business for myself (See, the goal-orientation drive is still there!) I am a partner with my husband, Phil Moon, in Loft Marketing, a nationally known marketing and market research firm. Loft Marketing offers a wide range of marketing related services including quantitative and qualitative, market research, product and business planning, advertising and public relations support and general marketing consulting. *All I have to do is figure out is an application of polarized light microscopy to market research! There must be a way!* We are located at 109 West Grand Avenue, El Segundo, CA 90245, (310)640-8610. We're minutes from LAX. Stop in and see us!

—Carol

1997 Board of Directors

Candidate's Statements

Treasurer—*Michael Parigian*

The treasurer receives all funds of the Corporation and deposits them in banks designated by the Board of Directors. The incumbent maintains financial reports and is responsible for the collection of dues. All expenditures are handled through the treasurer.

I have served as the treasurer of the CAC for the past two years. One of my major duties is to monitor the A. Reed and Virginia McLaughlin endowment fund. The investments from this fund, during my term in office, have grown $240,000.00. The investment is presently hovering around the $1,000,000.00 mark.

The Edward F. Rhodes III memorial fund was established and I have created record keeping systems for maintaining and disbursing these funds.

There is one item I would like the membership to remember. The CAC does not receive any money from either of these funds for normal operating expenses. The

Association's budget is provided through dues and seminars.

During my second term it will be my goal to have the Association work within its budget. I will update and implement policies to help ensure that this occurs. I would like to thank you for your consideration of my candidacy.

Editorial Secretary—*Raymond Davis*

My name is Raymond Davis and I'm running for a second term as Editorial Secretary of the California Association of Criminalists. I decided to re-up for another tour of duty because of all the fun I've been having in the publishing the best regional forensic publication in America. With your contribution of articles to the CACNews, John Houde's artistic talents, flawless printing and timely mailing by Fleming's Letter Shop along with my interest in reading and editing, I'm looking forward to bringing you the quarterly CACNews. My goal is to make it enjoyable, reader-friendly and informative. I think you will agree with us that our association's newsletter will be something you'll look forward to receiving. Thanks for your support and encouragement.

President Elect—

No statement available by press time.

Regional Director (South)—*Joseph Hourigan*

California is home to many talented criminalists, and the best belong to the CAC. Having been a member for nine years, and a past seminar Chair (1995), I know the value of involvement in our association. It would be an honor to serve in the capacity of Southern Regional Director, and I thank the Nominating committee for seeking me out. Outgoing Director, Dave Stockwell is to be recognized for the fine work he did coordinating the Study Groups, arranging dinner meetings and the many other duties of the office. I hope to carry on Dave's legacy.

Catch all the action!

in worldwide forensic science issues by subscribing to the Forensic Listserver "Forens-L." Completely free, this message board is always buzzing with hot topics about certification, use of canine detection methods, DNA technical questions, crime scene processing methods and even requests from TV producers for broadcast ideas. Read what Pete or Carol say when they aren't writing for the CACNews. To subscribe, just send a message to:

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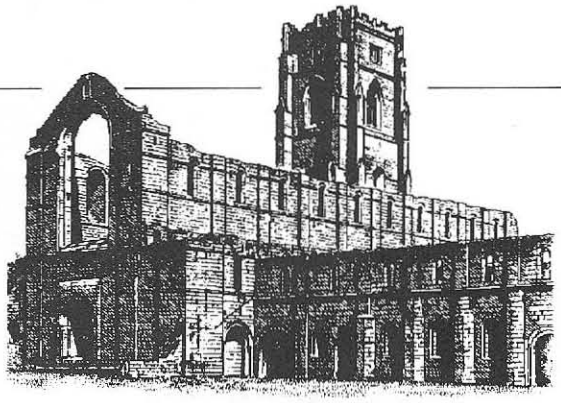

Hey! Hey! Heading for Harrogate!

The Joint CAC—Forensic Science Society Meeting is just ahead and lots of plans have been made to make this a wonderful sequel to our historic Pasadena joint venture, And it's not too late to get in on the action. Here's the way things are shaping up. The theme is "International Forensic Science and Justice," scheduled for July 9—12, 1997 at the "Moat House Hotel" Harrogate, N. Yorkshire.

Venue: The Moat House is an excellent modern hotel (I'd rate it "three-star" for whatever that's worth!) near the center of historic Harrogate. The pound is presently about $1.60, so £90 per person (£45 for spouse) *including* dinner, breakfast and lunch makes this a very desirable deal. See hotel form sent to membership.

Program: Stella McCrossan and Paul Millen have put together a very high quality program spanning all four days. It shapes up something like this: Weds. a.m.—General "Police Science's topics—crime scenes, latents, impression evidence, blood.Weds. p.m.: Parallel Specialist Sessions: DNA (General), Crime Scene Reconstruction (Chaired by **Jerry Chisum**). Thurs.a.m.: Parallel Sessions on "Case Intelligence" Methods, Shoes, DNA., M.O., etc. Thurs. p.m.: Parallel Sessions on: Shoemark Databases, DNA Statistics/Databases. Fri. a.m.: General Papers on Fingerprints, Fires and Crime Scenes. Fri. p.m.: Parallel Sessions on: Fire Reconstruction and Investigation Chaired by **John DeHaan**. Sat. a.m.: Major Cases—International and Local Perspectives (O.J. et seq.)

Wow! All this and a chance to meet and hobnob with many of the "legendary" names of British (and American, too) forensic science—Stuart Kind, Brian Caddy, Robin Holleyhead, Ian Evett and many more! Anne Holdsworth and her staff have planned lots of *special* evening activities and the hotel will have a pub set aside just for our use! Another reason to stay at the Moat House.

Tours: Harrogate is central to North Yorkshire, so fabulous places like Ripon Cathedral, (with the oldest surviving crypt in England over 1300 years old beneath its floors) and Fountains Abbey (pictured), ca.1300, are less than an hour away. Further afield are the glories of York itself and the tranquil beauty of James Herriot's Yorkshire Dales. Plans are being made to visit Black Sheep Brewery, home of one of the newest (and best) of Britains historic dark brews, just an hour away in Masham. And many more interesting and beautiful places lie on thecoast to the east—like Scarborough.

No language barriers (except in parts of Scotland, Yorkshire and Newcastle!) See you there! Contact John DeHaan or Linda Wraxall, or FAX 011-44-1423-566391

Jobs • Meetings • Courses

Spring '97 CAC Seminar

The 89th semi-annual meeting of the California Association of Criminalists will be held at the Radisson Hotel in Sacramento, Tues., May 27th through Saturday, May 31st, 1997. We are planning some new and diverse activities for this meeting, to make it one you won't want to miss and one you will never forget!

The Radisson, (800) 333-3333, is offering a special room rate of $79 per night, for single or double occupancy. Free shuttle service is available to and from the Sacramento Airport. Amenities at the Radisson include: an in-house lake with paddle boat rental, a fitness center, and an outdoor lakeside pool and spa. The hotel also offers two restaurants, one cafe and one lounge with nightly dancing. Nearby attractions include: golf courses, tennis courts, Historic Old Town Sacramento, the State Capitol Building, the Downtown Plaza and the Arden Fair Mall. Free shuttle service is available to these areas as well.

There are FIVE diverse workshops being offered: DNA User's Group, Shooting Reconstruction, Crime Scene Reconstruction, Clandestine Laboratories: Response to Analysis, Management and Leadership Skills for the Technical Person. Additional information on workshops and registration fees will be provided in upcoming announcements. The technical program will be held on Thursday, Friday and Saturday morning.

The American Board of Criminalistics (ABC) Certification Examinations are scheduled to be given on Saturday May 31, 1997. If you have any questions, please contact Pete Barnett at (510)222-8883. For additional information, check out our HOME PAGE on the Web at: http://www.ns.net/dlecci/cacsac.htm

See you in Sacramento in the Spring! Ann Murphy / Jeff Herbert, Seminar Committee Chairs. Contact information: Sacramento County Laboratory of Forensic Services, 4800 Broadway, Suite 200, Sacramento, CA 95820 phone: (916)732-3840 fax: (916)732-9620.

Career Opportunities in San Bernardino

The San Bernardino County Sheriff expects to be recruiting for a Latent Print Examiner, salary range $29,000 - $35,000 per year. They are also recruiting for a Supervising Forensic Specialist, salary range, $32,000 - $39,000 per year. Recruiting will take place during April and May, 1997. Interested persons can contact: P.M. Kellett, Lab. Dir., Sheriff's Scientific Investigation Division, 2OO South Lena Road, San Bernardino, CA 92415.

SCANNING 97

The Ninth Annual International Scientific Meeting is scheduled for April 19-22, 1997 at the DoubleTree at Fisherman's Wharf, Monterey, CA.

Sunday, April 20, 1997 (8:30 a.m. - 4:30 p.m.) Forensic Science Workshop. This is the first time this workshop has been offered. It will be devoted to scanning microscopy analysis of forensic samples including instruction in the collection, handling, preparation, and interpretation of samples related to ballistics, questioned documents, physical/trace evidence and product tampering. The workshop will be instructed by four forensic scientists, each a specialist in their area of expertise. The course will include a brief introduction to SEM/EDX, "tips, tricks and pitfalls" and related forensic case studies including interaction with instructors. Scheduled Instructors: Mary-Jacque Mann, US DI National Fish and Wildlife Forensic Lab. S. Frank Platek, US FDA Forensic Chemistry Center, Alan Walters, US Postal Inspection Service, Forensic & Tech. Services, Dennis Ward, US DOJ FBI.

Monday, April 21, 1997 (8:00 a.m. - 5:00 p.m.). This second day will be devoted to the Symposium "APPLICATIONS OF SCANNING MICROSCOPY IN FORENSIC SCIENCE." Scheduled speakers currently include: Barbara Berrie, National Gallery of Art, Smithsonian Inst., Washington D.C., Van Bullman, Proctor and Gamble Pharmaceuticals, Norwich, NY, David Howitt, Dept. of Chem. Eng. & Materials Science, UC-Davis, Davis, CA, Nathan W. Galbreath, AFOSI, Buckley AFB, CO, **Amy Lynn Mongan**, Forensic Analytical, Hayward, CA, S. Frank Platek, US FDA Forensic Chemistry Center, Cincinnati, OH, Val Vallyathan, Nat. Institute for Occ. Safety & Health, Morgantown, WV William Wallace, Nat. Institute for Occ. Safety & Health, Morgantown, WV Arie Zeichner, Israel Police Headquarters, Jerusalem, Israel.

In addition, the symposium will include contributed papers and the always popular roundtable discussion in the "FORENSIC FORUM." SCANNING 97 offers many other symposia, poster sessions, instrument exhibitors, and short courses during the four day meeting including social and regional recreational activities. Plan to attend and participate in the First Forensic Science Workshop and the Fifth Annual Applications of Scanning Microscopy in Forensic Science Symposium.

For topics and contents, contact the Workshop (Short course) and Symposium Chair. CONTACT: S. Frank Platek, US FDA Forensic Chemistry Center Phone (513) 684-3501, FAX (513) 684-6082 E-mail fplatek@smtp.ora.fda.gov. For information, accommodations, and registration, CONTACT: Mary K. Sullivan, SCANNING 97

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Ed Jones' Face Game

Out-of-Towners

Answers inside back

Raymond Davis

Contribution

A friend of mine was discussing his views about the state of our welfare system when he made an interesting and profound comment that I want to tell you about. He believed that it was every person's responsibility to take care of themselves and to give a little back to society. As soon as I heard that comment, I zoned out! My mind raced off in a different direction. I really don't remember much more of what he said after that. I was really taken aback by the simplicity and magnitude of that statement. I began to think about the changes that would occur if every person had the ability to care for their own needs and then had the resources to be able to give some of it back. One of those changes I perceived was that societies would use these resources for advancements in the human condition instead of just trying to get by. My mind soon wandered away from the general topic of welfare to a more specific thought concerning the second part of his statement, 'giving something back.' When a person gives something from themselves to help others we call it a contribution. I want to talk about the contributions we make to our careers and to our profession of forensic science.

I believe the act of contributing comes from those who are able to manage their own careers and have the resources to share their knowledge, wisdom and time. They know what they need to do in order to be successful. These people continue their formal education, work at improving their technical skills, attend many seminars, sometimes at their own expense and constantly read journals and seek the counsel of others. These people make up a special group of forensic scientists who daily make contributions at every level in the profession. You will notice them if you look closely enough. They're not necessarily the richest or the brightest people in the field. What makes them special is not just their ability to manage their own careers but that they make it a point to "give something back." Some are laboratory managers. Individuals willing to take responsibility for bringing their laboratory's work and the practice of forensic science to its highest level. There are some that I refer to as, "go-to people". You know these people, because you go to them because they always seem to have the answers you're looking for along with the time to help you. I have known some very good "go to" people that have helped in my career over the years. Others actively participate year after year on behalf of our association. Still others teach. This in addition to their normal duties. No extra pay or incentives, just the satisfaction that comes from making a contribution. It is a selfless act when people donate their time and energy to others.

As I wrote this I began to ask what my contributions are to this profession. I had to begin with a self assessment of my ability to manage my own career. I was the type of person who needed to be managed because I was expecting my agency to do that. I mistakenly assumed that it was their responsibility to train, educate and promote me to the highest level of criminalistics. I had to leave government service and strike out on my own to realize that I wasn't making it in my career. Thirteen years of running my own consulting laboratory in Seattle proved to me that I was the only person responsible for my career. Not the lab manager, not my colleagues and certainly not the DOJ—ME! Once I became accountable for my career and reputation, I began to study more, attend more seminars, seriously read articles in the forensic journals, publish as well as present technical papers. None of this was easy because I expected DOJ to do all this for me when I began my career with them.

The years of hard work have certainly paid off. They brought big changes and made me a better criminalist in the process. I now realize that those who make a commitment to their own careers soon find themselves making contributions to the field. I believe that it's inevitable. It's not that these people are so full of themselves, it's just that they have reached a point in their lives and careers where there is a level of expertise that needs to be shared. Some names come quickly to mind for me and I won't embarrass anyone here, OK Mikey? There are, however many people who have made great contributions to the field of forensic science and the CAC. Ed Jones of Ventura Co. has reminded us in several past issues of the CACNews of those individuals who have made great contributions to our profession. I know his "Face Game" is just a short list of contributors. I also know that you could easily add more names, both present and past who have had an impact on your career and on our association.

Finally, let me challenge you to have your name placed on the roll call of "Contributor". You can make this list if you are willing to be responsible for your career and in the process help other criminalists in theirs. In so doing you will advance your career and the profession of forensic science. Find a way that works for you. You know your strengths and skills. You know what works best for you. Make a commitment to take care of yourselves and to give a little back. Carol Hunter says in "CACBits"(pg 5), "...to choose to dedicate a portion of your life toward your own professional development." I believe that when you choose to do what she recommends that great things will begin to happen in your career. Goethe once said, "Whatever you can do or dream you can, begin it. Boldness has genius, power and magic in it. Begin it now." Give it a shot. Thanks for listening.

• • •

Two people wrote in to inform me of a few typographical errors in the last issue of the CACNews. I appreciate the feedback and the knowledge that there are people who read this publication at such a high level of precision. Thanks, keep me on my toes.

Raymond

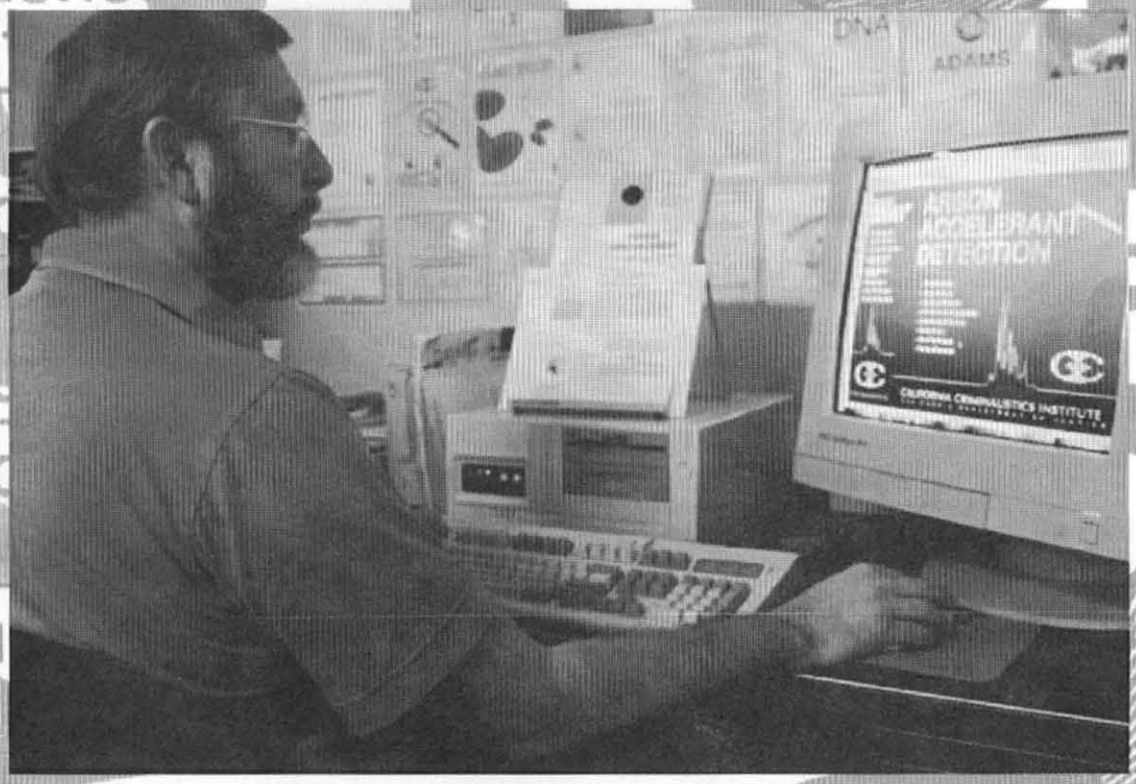
From the Reader

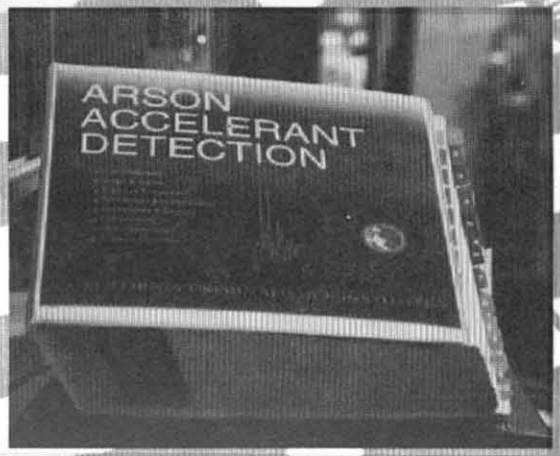
Letters continue on page 14.

Manual Arts

One thing you could always count on

was that a government issued technical reference manual would be booooring. Ho-hum graphics with reams of charts and dry prose suitable only for the most incurable of insomniacs. Not so for the reference manuals distributed by the California Criminalistics Institute! These vividly decorated collections have been given life by Stanley Brown, a Graphic Artist with the CCI. His work graces our cover this quarter thanks in part to the kind cooperation of Victor Reeve, Lou Maucieri and Fleming's Letter Shop. Stan, with the CCI since 1989, has been in demand statewide for the preparation of illustration, charts, diagrams and other displays for the Bureau of Forensic Services, Division of Law Enforcement and the Department of Justice.





Origin of Species

The Development of the
California Criminalistics Institute

Victor C. Reeve, Laboratory Director

The California Criminalistics Institute (CCI) presented its first class to fourteen criminalists, October 14, 1987; the topic — *Safe Handling of Firearms.*

Lowell Bradford and Areyh Samuels 1968, expressed the need for a centralized training facility to support the criminalistics profession.(1) In 1969, W. Jerry Chisum and Theodore Elzerman proposed federal funding of a state regional crime laboratory system to include a training/research facility (2)

July 13, 1984, Lowell Bradford presented a paper to the California Association of Crime Laboratory Directors proposing a centralized training and research facility. The State of California, Dept. of Justice (DOJ), in the interim had piloted a centralized training and applied research unit in the 1970's (Technical Services Unit), which it disbanded during the late 1970's. A lot of the training and applied research for California criminalists was coordinated for several years through that unit.

In the 1980's, Gerry Clemons, Director of DOJ's Division of Law Enforcement, requested a Bureau of Forensic Services plan for the 1980's. This December 1984 document called for a centralized training and development concept (Research, Reference, Referral and Training Laboratory). It had statewide support from a 1984 client survey of police chiefs, sheriffs, and district attorneys. The concept was not fully developed until Bureau Chief Steve Helsley was assigned to the Bureau of Forensic Services (BFS). During that year Criminalists Al Biasotti, Jerry Chisum, and Lou Maucieri helped develop the first CCI concept paper (7/85) that formed the substance of the bill by Senator J. Seymour (SB 2390). The California Legislature enacted the Seymour sponsored bill in 1986. This enactment initiated State funding of CCI, which eventually led to an official Attorney General's dedication in August 1990. Since that time, resources available to CCI have ebbed and flowed with the State fiscal situation. During the period from 1989 to 1996, over 125,000 student hours of forensic science training, consisting of over 300 courses have been presented; with over 4,000 students in attendance.

The construction of the physical plant and staffing of CCI was accomplished between October 1986 to October 1989 under the management of Cecil Hider. Mike White managed CCI from October 1989 to May 1990 and Linda Hartstrom was in charge from May 1990 to September 1991. The current manager, Victor Reeve, was assigned as Laboratory Director in September 1991.

CCI has never received the staffing that had been originally projected (19 professional staff), but its dedicated staff have worked hard to accomplish its goals. The Institute has received two unit citations (1988 and 1992), and two CCI program managers have received Sustained Superior Accomplishment Awards (1994 and 1996). Peace Officer Standards and Training (POST) student evaluations have consistently exceeded an average of 5.4 out of a maximum score of 6.0.

CCI provides POST certified forensic training to state and local criminalists, toxicologists, latent print examiners and other specialists. The Institute has been the only source of this training, other than the FBI Academy in Quantico, and currently offers twice as many forensic courses as the FBI. In 1996, the CCI provided 59 courses to a total of 828 students. Over the last six years, without any staff increases, CCI has increased its annual number of courses by 295% (20 to 59 classes).

CCI's priorities and course schedules are developed with input from a Users Advisory Board (UAB). It includes representatives from the California Association of Criminalists (CAC), California Association of Toxicologists (CAT), International Association of Identification (IAI), California State University and University of California systems, and POST. Both CAC and CAT have contributed funds to subsidize courses for their members. Various agency crime laboratories generously provide a number of the instructors for CCI's courses.

CCI is actively engaged in a major DNA training program, which is partially funded by a federal grant. This project is designed to provide state-of-the-art instruction in PCR-based DNA analysis to California's crime laboratories over the next five years. CCI is also organizing the establishment of centralized trace evidence analysis unit which will provide advanced materials analysis capability, initially for BFS laboratories, and then for all crime laboratories in California. The unit will also gather extensive reference collections of trace evidence materials (hairs, fibers, glass, paint, etc.). The Institute is also pursuing academic credit for its in-service courses. Discussions are underway between BFS and faculty representatives of the University of California — Davis (UCD), aiming to offer both a certificate program for CCI classes through University Extension, and an affiliated advanced forensic science degree through UCD.

(1) SRI, "Research and Development Needs in Criminalistics". (2) CII Grant Proposal to CCCI (OCJP), "Crime Laboratories in California", 1969

Collection and Handling of Biological Evidence for DNA Analysis, Part II

Continued from the Winter 1996 Issue of The CACNews

*by Theresa F. Spear**

Packaging Materials

After the sample has been collected, it should be placed into a suitable container which serves to further protect the item, to record the chain of custody and to describe the evidence item. The most important feature about this aspect of evidence handling is that this packaging material should be porous. This feature will allow any sample which is not entirely dry by the time it is initially packaged, the chance to completely dry. *Paper envelopes or bags are the easiest way to accomplish this goal.* If the evidence is a heavily bloodstained garment, it should be allowed to dry. A piece of clean paper can then be placed over the top of the item and the item can be folded so that the paper helps to prevent direct contact between separate stains. Ideally, each evidence item should be packaged in a separate, paper container. As long as paper bags and envelopes are not reused, they will not be a source of contamination.

Good Sample Handling Practices in the Laboratory

There are a whole variety of practices that minimize the possibility of contamination in the initial evidence examination process at the laboratory. These can be broken down into two categories: (1) practices that prevent sample transfer and (2) practices that are capable of either removing or destroying any transferred sample.

With respect to the first category, the use of disposable, single-use supplies helps ensure that there are no inadvertent sample transfers. These supplies include microfuge tubes, barrier pipette tips, and clean paper work surfaces (changed between each sample). There are also laboratory practices that prevent samples transfer. The order in which samples are worked can be used to minimize the risks of contamination. For example, evidence stains can be worked at a different time than reference samples. In addition, samples that contain a small amount of DNA (e.g. 1 mm bloodstain) should not be grouped with samples that contain a large amount of DNA (e.g. a large semen stain). Other practices include using a decapper to open tubes containing biological samples, washing or changing gloves whenever they might have contacted a sample, pre-aliquoting reagents, using premade "master mix" reagents, insuring that sample tubes are not placed side by side in a sample rack but are separated by an empty space and only having a single evidence item open at any one time. Finally, using good laboratory technique in manipulating pipettes (e.g. not blowing out the residual liquid in a pipette tip) or handling sample vials (e.g. insuring liquid is at bottom of the tube when opening) helps ensure that aerosols are not created. All of these techniques will minimize the chance of inadvertently transferring DNA containing material.

The second type of practice to control contamination relies upon the ability to remove and/or modify DNA so that it can not be effectively used as a template in a PCR reaction. Studies conducted at CCI have shown that brushing a dry swab across a saliva stain is capable of collecting a sufficient amount of DNA to enable a typing result to be generated in a PCR-based test. Thus, it is important to ensure that any surface which is allowed to come into contact with an evidence sample be free of any human biological sample. The ease of cleaning surfaces of biological samples is related to the amount of material present, the technique used to wipe down the area, and the type of cleaning solution applied. In recent experiments performed at CCI, ethanol was *not* found to be the most effective cleaning agent. The most effective cleaning agent to decontaminate working surfaces is a 10% bleach solution. (Although we have found a 10% bleach solution effective on biological samples and extracted DNA, a 20% bleach solution was required to effectively clean surfaces of *amplified* DNA.) Keep in mind that bleach can corrode certain metal surfaces (especially if it is allowed to remain in contact with the metal for an extended period of time). It is good laboratory practice to routinely clean sample racks, bench tops or any other sample working surface with a recently made 10% solution of bleach and then remove any residue of the bleach solution with a second wipe using a fresh paper towel.

Summary of Recommendations

Goals of Biological Evidence Collection

1. Collect as much sample as possible from a single source. Keep biological evidence stain concentrated.

2. Ensure that the sample is not inadvertently mixed with other biological samples. Wear gloves. Change gloves if they become stained with any biological sample.

3. Handle the sample in a manner which minimizes deterioration of the sample. Air dry the sample as fast as possible.

Recommended Methods for Collection of Biological Evidence

Listed in Order of Desirability

1. When feasible, take object with stain. Do *not* remove stain. If stain can be easily dislodged (e.g. stain is on non-porous surface), protect it from contact with another object. One way this can be done is by immobilizing the evidence item in a cardboard container.

If evidence stains are found on objects which can be cut (e.g. a rug), the evidence stain can be removed by cutting it out with a pair of clean scissors. Remember to also take a "unstained" control cutting (e.g. the substrate without the stain) from the object.

2. If object can not be moved, use a slightly dampened substrate (cotton swab or piece of plain, cotton cloth or gauze) to collect stain. Remember to collect an unstained control by swabbing an unstained area of the object. Do *not* scrape stains to collect them. The size of the stain should influence the size of a substrate used to collect the stain. Thus, use a small part of a swab or a small piece of cotton cloth or piece of gauze to collect a small stain. Do not smear a small stain over a large surface To keep the stain concentrated, collect the stain on the smallest area of the swab or cotton cloth. Because of the attached wooden applicator stick, cotton swabs are easiest to use (tweezers are not needed). Use a pair of clean tweezers to manipulate cotton cloth/gauze, do not handle stain with bare hands. To minimize

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deterioration of the sample, use a minimum amount of distilled water to dampened the swab or cloth/gauze substrate. Allow all samples to air dry as quickly as possible. The longer a evidence stain is kept wet, the more it will deteriorate.

Other Considerations

1. To avoid contamination, do not allow one evidence stain to come into contact with other biological samples. Each individual stain should be collected separately. Do not collect or package two separate stains together. Do not allow evidence samples to come into contact with any surface which contains residue from another biological sample (e.g. dirty tweezers, bloodstained glove, contaminated work surface). Use tweezers which have smooth, easy-to-clean working surfaces. Tools (e.g. tweezers, scissors) can be cleaned by thoroughly rinsing with a stream of distilled water and drying thoroughly with paper tissue. Repeat this process twice before using tool to manipulate another sample. Working surfaces (that could contact other samples) should be cleaned with a freshly made 10% solution of bleach. Ensure that any bleach residue is thoroughly removed by wiping it down with another clean paper towel

2. Small biological evidence stains (e.g. 2 mm size bloodstain or hair) are most susceptible to contamination. Put on a fresh pair of gloves before collecting these small stains. If these stains have to be manipulated by a tool, consideration should be given to using new, disposable implements (e.g. new razor blade/ disposable pair of tweezers).

3. Package all biological evidence in paper bags or envelopes. Do not use plastic. Allow stains to air dry before placing in paper bag or envelope. Package different evidence items in separate paper containers. A piece of clean paper can be placed over a garment with a number of bloodstains. The garment can be folded so that the paper helps prevents contact between different stains.

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A Closer Look at the "Date-Rape" Drug: *Rohypnol*

Peggy Herbert and Jeremy Zerbe

Can you imagine waking up in the morning with no recollection of the previous evening? Most would say no, but it does happen to some on occasion. Imagine you are a young female waking up naked with the feeling of recent sexual intercourse, but no memory of the act. Would you think that you had consumed a bit too much alcohol and blacked out? Let's say that you know you didn't have more than two drinks but you felt as though the alcohol had a greater effect than usual. Would it cross your mind that you may have been drugged without your knowledge? If you ask yourself questions like: "How did I get home? Who brought me home? What happened? Why am I bruised?" You may have been exposed to more than you know. You may have fallen victim to a drug known as Rohypnol, the benzodiazepines' candidate for Schedule I classification. As Rohypnol continues to gain popularity this scenario will continue to become more and more common.

What is Rohypnol?

Rohypnol (row-hip-nol), a tradename of flunitrazepam, is manufactured in tablet form by Hoffman-LaRoche, Inc. Flunitrazepam is a benzodiazepine, which is in the same family as Valium (diazepam). It is a central nervous system depressant sold worldwide in 64 countries. Some markets include: Mexico, Central and South America, Europe and Asia. However, it is not manufactured or sold legally in the United States. Presently, the medical use of the drug is as a hypnotic sedative prescribed for insomnia, anxiety and panic disorders, and as a preanesthetic medication.

Drug Schedule

Rohypnol is a Schedule IV Controlled Substance Federally and as of January 1, 1997 was upgraded to a Schedule IV Controlled Substance in California. President Clinton, as of October 13,1996, recommended flunitrazepam to be added to those drugs listed in the "Drug-Induced Rape Prevention and Punishment Act of 1996".

How is it Obtained?

Illicit use of Rohypnol was originally reported in Europe in the late 1970's and has spread worldwide since that time. Rohypnol was first seen in the U.S. in the early 1990's in South Florida and Texas and has since spread to other parts of the country. Rohypnol has been smuggled into the U.S. from Mexico and Colombia, primarily through the Postal Service and commercial delivery services. However, a significant amount of the drug has entered the United States by individuals bringing it back from Mexico as a prescription medication. Initially, U.S. Customs, being unfamiliar with the drug and its effects, was unwittingly allowing the passage of significant amounts of the drug across the Mexican border, for so-called personal use[1]. There has been a trend of U.S. citizens in need of expensive pharmaceuticals going south of the border to take advantage of the Mexican economy and the reduced price of flunitrazepam and other popular drugs. Apparently, the sale of pharmaceuticals is of extreme importance to the Mexican economy, especially for the border towns such as Tijuana. As a result, the drug has been easily and legally obtained in Mexico by prescription. This can be up to a 90-day supply of the one or two-milligram dose tablets; this being the dose which gives the greatest effect to those using and abusing the drug. There is also some large scale smuggling of Rohypnol from Colombia, primarily through Miami. Overnight mail appears to be the preferred method of importation.

Difficulty of Visual Identification

Many law enforcement officials throughout the country are probably encountering Rohypnol, but have no idea what it is. In the original foil-backed, clear-plastic blister pack (bubble packs), it appears to be just another prescription medication and does not attract immediate attention as contraband. This fact is equally misleading to the occasional user of the drug. The packaging gives the drug the appearance of a legitimate prescription drug, which may mask its true potential. Rohypnol is a small white tablet that is marked with Roche 1 or Roche 2, depending on the dosage. It may be obtained as scored (one-milligram) or cross-scored (two-milligram) doses, on the opposite side of the tablet. Doses vary from one-half to two-milligrams. However, one and two-milligram tablets are the only forms produced commercially. The tablets are colorless, tasteless, odorless, and dissolve quickly in most liquids. Furthermore, it is ten times more potent than Valium of the same dosage[2].

As with all drugs of abuse, there are many street names for flunitrazepam. These include rophies, roofies, ropies, ruffies, R2, Mexican Valium, rib, rope, roach or roaches, the "forget pill", La Rocha, poor man's Quaaludes, and the most common mispronunciation, "roofenol". Rohypnol can be mistaken for Rivotril, generic name clonazepam. Both Rohypnol and Rivotril can be white tablets in the two-milligram dose. In addition, they have markings that are superfi-

[1]Webb, Dewey, "Rx Mex Hazy Regulations Allow Americanos To Write Their Own Tickets in Mexican Pharmacies", Phoenix NewTimes. Com, http://www.phoenixnewtimes.com/1996/040496/feat2side.html, 1996.

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cially the same. Both can be marked with ROCHE 2 on one side of the tablet. Upon closer examination, Rivotril differs in appearance from Rohypnol because the word ROCHE is in a straight line instead of curved at the top of the tablet. There is further difference with respect to the dosage markings. Rohypnol in the two-milligram dose has a "2" contained within a circle. Rivotril has a dot on either side of the "2" instead of a circle.

Symptoms

It is important for law enforcement and health care personnel to know the classical symptoms of Rohypnol poisoning: disorientation; staggering; inability to communicate or put up a struggle; a "hung over" feeling and a loss of short term memory. In fact, the symptoms of the drug closely mimic that of moderate to extreme alcohol consumption and the drug is often used in conjunction with alcohol to extend the effects of the ethanol. However, when flunitrazepam is mixed with alcohol the effects are synergistic, that is, their combined effect are greater than the sum of their individual effects.

Drug Combinations

Alcohol is not the only drug abused with flunitrazepam in the polydrug scenario. Heroin users are reported to use flunitrazepam in addition to heroin. This reportedly has an effect of enhancing the effects of a low-grade batch of heroin. Cocaine is another common drug of abuse used in conjunction with flunitrazepam. The flunitrazepam is useful for cocaine addicts in lessening the effects of withdrawal between fixes. The repeated use of flunitrazepam can cause psychological and physiological dependence on the drug. As with many drugs of abuse, the felt effects of the drug are lessened as tolerance is increased. As a result, the use of flunitrazepam can become increasingly more dangerous as dosage levels increase to achieve the desired effects. Although, there are few deaths directly linked to benzodiazepines as a drug class, death can and will occur with their use when they are mixed with alcohol and other drugs that depress the central nervous system. Particularly with alcohol, the danger is related to the very fact that the drug is a central nervous system depressant and can result in drowsiness, lethargy, and coma which leads to the shut down of the respiratory system. Death will follow shortly after.

Pharmacology

As with all drugs introduced into the body, there can be four distinct areas of discussion. The drug must move into the body, be distributed, metabolized, and then excreted. These four functions can be considered separately, but in the same respect they are all part of a dynamic system that is involved in the processing and utilization of all things taken into the body.

Rohypnol can be taken orally, snorted, smoked or injected intravenously. Ingestion is the most common mode of intake for this drug. As a result of the drug ingestion, it is dissolved in the aqueous environment of the stomach and it is at this point the parent drug is directly acted upon by enzymes in the stomach and broken down into its metabolite forms. This is then easily absorbed through the gastrointestinal walls. In fact, benzodiazepines appear to be absorbed more rapidly when taken orally than when administered through injection. Since all benzodiazepines are lipid soluble, it is easy for them to pass through membranes in the body.

Many law enforcement officials throughout the country are probably encountering Rohypnol, but have no idea what it is.

After absorption into the wall of the stomach and intestines, the drug is taken into the bloodstream for distribution to the other parts of the body. The liver, brain, kidneys, and heart are highly vascularized organs. These are the organs that receive the vast majority of the remaining parent drug and metabolites.

With the metabolites significantly dispersed in the body they can now act on the target tissues. These metabolites are much more reactive than the parent drug. The most active metabolites formed are 7-aminoflunitrazepam and N-desmethylflunitrazepam. The metabolites act directly on the central nervous system, which is composed of the brain and spinal chord. Flunitrazepam must be completely metabolized before it will be excreted. In fact, the chief responsibility of metabolism is to change the parent drug so that it can be excreted easily.

The metabolites are a derivative of the parent drug. These derivatives have a greater hydrophilic (attraction to water) character than the parent drug, which will make them more easily dissolved into the aqueous urine. This completes the final stage in which the drug is passed out of the body through the urine.

Rohypnol produces effects within 20-30 minutes[3]. The effects can peak within two hours and may last eight or more hours. Although the drug is classified as a depressant, Rohypnol can induce aggressive behavior in some users. It can induce anterograde amnesia. This type of amnesia makes it difficult for a person to remember the events following the ingestion of the drug. Amnesic effects can last up to 1-1/2 days. The drug is metabolized quickly and therefore passes quickly. Since the drug may have significant effects on memory, the window of opportunity for analysis is greatly diminished. This very fact makes the detection of the metabolites difficult.

Can it be detected?

Currently many forensic toxicology laboratories are not prepared to run definitive tests for Rohypnol in physiological fluids. However, there is ongoing research being done for more sensitive testing procedures. "It was not until recently that the laboratories became aware that a negative screen test for benzodiazepine did not rule out the presence of Rohypnol or its metabolites."[4] Theoretically, Rohypnol can be detected at therapeutic levels at 10-20 ng/ml in whole blood, but neither Rohypnol nor its metabolites is known to have been detected in blood or urine at this level. A one-milligram dose can have a blood level peak in one to two hours after ingestion and after 16 to 36 hours will drop to one-half peak level. Even though Hoffman-LaRoche cites a 72-hour period for testing, a 36-hour period should be considered the window of opportunity for detection.

At this time, detection limits of immunoassay screening tests for Rohypnol are not well documented. There are commercially available assays for screening

[2]DEA Highlights 1995, http://www.usdoj.gov/dea/pubs/rohypnol/rohypnol.html
[3]Banta, Melinda, "Rohypnol", Tieline, Volume 20, Issue 1, Summer 1996, p. 7.
[4]Haight Ashbury Free Clinics, Inc., Rohypnol (Flunitrazepam) Fact Sheet, http://www.lec.org/DrugSearch/Documents/Rohypnol.html., p. 4.

benzodiazepines, but the application of the assays often lead to false negative results due to their lack of sufficient sensitivity. This is due to low cross-reactivity and/or low concentrations in the therapeutic range. FPIA (fluorescence polarization immunoassay) and EMIT (enzyme-multiplied immuno technique) urine screening methods have been reported for Rohypnol metabolites. This can be achieved with or without enzymatic hydrolysis. Although, both assays are sufficient for urine tests reflecting recent abuse, they are not sensitive enough to detect Rohypnol below the therapeutic dose levels. Rohypnol can be detected and confirmed in body fluids through the use of Gas Chromatography/ Mass Spectrometry and Infrared Spectrophotometry testing. Different laboratories still have a wide variability in their detection abilities. There is still not much awareness of these issues on the part of many law enforcement agencies or rape crisis centers.

Author's Note

Much of the information used for this paper was derived from the Internet. Although there are no documented cases of rapes involving Rohypnol in California, this does not mean that the drug was not involved. The stories of rape where Rohypnol has been suspected have amazing similarities. They involve a potential victim that is usually attending some public gathering at which their drink is spiked with the drug. Not aware of this, the beverage is consumed. After a short period of time, the individual is escorted from the immediate surroundings and raped. Although the victim may fade in and out of consciousness during the act, the memory of the event is largely a blur and may be absent altogether. Victims can have difficulty sorting out what happened to them and this may affect their decision to report the incident to law enforcement, if reported at all. If blood and urine samples are taken, it is imperative that they are taken as soon as possible after the time of the assault. For the success of future cases, it is important to develop more sensitive methods and have the victim report the crime sooner. Also, the forensic community needs to be more aware of the detection difficulties.

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From the Reader

Immoral Certainty

There is a standing joke around the lab that some criminalists can look at the evidence all day and never reach a conclusion, while others have gotten so good that they no longer need to examine the evidence at all. It is this latter group that worries me. A couple of cases may serve to illustrate:

An issue arose of who fired first in a shootout through an aluminum frame window. The people's criminalist examined the bullet under the microscope and found no metal transfer. A venerable defense expert was called upon to re-examine the bullet, whereupon traces of aluminum were detected by SEM-EDS. Armed with this instrumental data, a conclusion was reached to the effect that this bullet contacted the aluminum frame. The conclusion lent considerable support for the defense's assertions. More cautious inspection would have revealed that the mounting material used to hold the bullet under the microscope was the more likely source of the aluminum. Such media was visible under the light microscope.

In another case, a metal chip thought to be drilled from a burglar alarm bell was found in association with a suspect. Using a newly purchased Plasma Emission Spectrograph, a government criminalist with long years of experience concluded that the elemental compositions of the bell and chip were "identical." Surprisingly, the police, rather than being ecstatic, were troubled enough to send the chip to a private metallurgical laboratory. By polishing the chip and examining it under a light microsope they found its grain structure to be quite unlike the bell. Further, by quantifying the elemental composition rather than simply identifying the elements as was previously done, they found gross differences between the two alloys, reaching a conclusion of "not similar."

What do these two cases have in common? Several things, all bad. In each case the criminalist fell into the trap of relying on "blind instrumentation" rather than "trusting the old eyeballs" as Doug Deedrick said in the OJ case. It is a trap. Author Michael Crichton coined the phrase, "Seduced by their own technology." That sums it up pretty well. These two criminalists each had over twenty years of experience and should have known better. They never really "looked" at the evidence.

Some scientists get so long in experience that they think they've seen it all. "Why, I've seen hundreds of these cases...etc, etc." But they themselves admit that one of the best things about forensic science is that no two cases are ever exactly the same. It could be that this overconfidence is fueled by a continuously stroked ego. Some of these well traveled folks have been reminded so often of their greatness that they become candidates for the infamous "Sour Apple Award" (Presented to the celebrity who most believes his/her own publicity).

It is also not uncommon to have "flunkies" do the actual analysis, running the instrumentation, GC/MS, etc. After all, it's practically impossible to master all the currently available technologies. But it's the one with the Name who signs the report. It's the one with the Name who journeys afar to offer his considered opinions before courts of law. The resume fattens with accounts of high profile cases that were "worked".

The CAC has a carefully thought out Code of Ethics which states in part, *"The true scientist will make adequate examination of his materials, applying those tests essential to proof."* The operative word here is "adequate." In our two cases, was the examination adequate? Did the criminalists even "make" the examination?

—John Houde

DNA dreams

It had always been the goal of the Ventura County Sheriff's Crime Laboratory to perform DNA testing one day. Of course the usual budgetary restrictions seemed to always get in the way. Early in 1996, the dreams became a reality when ground was broken for the first DNA testing area in the Ventura lab. An area of the laboratory was designated as the DNA area, plans were prepared and contractors called in. It didn't happen overnight, however, and before a single wall could be moved an exhaustive study of other crime labs was in order. The goal here was to design a PCR laboratory within the present facility, and by acquiring some under-utilized rooms and relocating some storage areas, the necessary space requirements were met. That left cavernous empty rooms which took a great deal of imagination to picture what would become a modern DNA facility.

Top, middle, bottom: Amplification room

The lab, as planned, included a PCR "Extraction Room" where the DNA would be extracted from various evidentiary samples. Another room, the "Set-Up room," where the various kit components are aliquoted and stored, and the samples are prepared or set up in preparation for amplification, would also be required. Then we needed the "Amplification Room" where the amplification of the samples and the typing procedures actually occur. The amplification room is entered and exited by way of the "Ante Room." These rooms are separated by the "Photo Room" where our gels and typing strips are photographed.

The cost for realizing the dream was not cheap, estimated at about $100,000. Not included in that figure would be personnel, presently staffed at two full time criminalists. Additional personnel are planned.

With great anticipation, each day's construction was watched as a little bit more order was formed from the chaos. As the pictures attest, the finished product is a thing of beauty to any laboratorian.

Now we'll just have to wait for validation studies to be completed before beginning actual casework.

—Margaret Schaeffer

Below: The best (if not the safest) way to apply spackle to the ceiling.

Dreams do come true.
Middle: Extraction room, bottom: Amplification room

Our Criminalistic Roots:

Philip O. Gravelle—*Pioneer Photomicroscopist*

One evening, seventeen years ago, a friend called at the home of Philip O. Gravelle in South Orange, N.J. He was starting on a vacation and wanted to leave a microscope for safekeeping. Gravelle, who was nearly forty, had never looked through a microscope in his life. It was like putting on magic glasses. That instrument, left by chance at his door, started him on the hobby of a lifetime.

Today, at fifty-five, he has won worldwide honors in microscopy. He has been made a Fellow of the Royal Microscopical Society, a Fellow of the Royal Photographic Society, and is the only man in America to win the coveted Barnard Medal of the London Photomicrographic Society. He is the originator of the comparison microscope method of tracing bullets to the guns that fired them. He has played a pioneer role in applying the microscope to industry, criminology, and advertising. And he has accomplished all this in spare hours and odd moments, pursuing his hobby when the regular day's work was over and he sought relaxation.

His laboratory, built at the back of his home in South Orange, is probably the finest private workroom of its kind in existence. It is the dream of a hobbyist come true. Rows of instruments, cabinets of slides, shelves of auxiliary lenses, batteries of cameras, lights of a dozen kinds pack the room in orderly array. They represent almost every conceivable aid to fine work.

In this paradise of the amateur microscopist, I recently spent the better part of a weekend watching Gravelle at work. A tall, spare man with graying hair and mustache, he adjusts lights, focuses cameras, snaps shutters to record on film a strange, mysterious, fascinating world that lies beyond the reach of human eyes.

The tip of a snail's tongue, blood corpuscles battling an infection, colloid particles vibrating in a film barely one ten thousandth of an inch thick are among the wonders he photographs.

Often he takes the same picture over and over, as many as twenty times, to get it exactly right. He works carefully, methodically, scientifically. He keeps a written record of everything he does. Each negative has a number and on the filing envelope in which it is kept, as well as in a master book, he places complete data on the camera, the microscope, the light, the film, the filter, and even on the paper and developer used to produce the final print. Any other microscopist, following this data, can produce the same results.

Behind his laboratory, Gravelle has a pool dotted with lily pads. It supplies an almost endless stream of exciting adventures. From its water, he fishes delicate organisms that expand under the microscope into fantastic creatures or plants of a thousand weird designs; into living threads of thin green algae; into blue-gray flower-like Plumatellae; into strange cigar-shaped Pinnulariae, plowing through microscopic debris like submarines.

One morning he found the water of the pool a brilliant green. At first, he thought it was filled with pollen from overhanging trees. But his microscope revealed it was teeming with a new kind of protozoa.

On the yellowing pages of a large record book, Gravelle has penciled notes that go back to the very first object he photographed. It was a drop of blood magnified 500 times. While his friend was away, he hitched an old view camera to the microscope and, using a gas lamp with an inverted mantle for illumination, took his picture. The exposure lasted three minutes. Today, with modern lighting, he obtains a similar photomicrograph in as many seconds.

By the time his friend returned, Gravelle was poring over microscope catalogs, choosing an instrument of his own. During the months that followed, he added to his equipment, swapping apparatus, picking up secondhand instruments, purchasing new aids to his engrossing hobby. His tip to beginners is to avoid secondhand microscopes unless you have a friend who knows lenses and will help you.

During his education at Columbia University and Pratt Institute, Brooklyn, N.Y. his interest in camera work led him to specialize in chemistry. After he had become a designer of textile patterns, with offices in New York, he continued with his hobby, concentrating on landscape and color pictures. This photographic background has been of immeasurable aid in making snapshots of the invisible.

The early pages of Gravelle's record book are filled with a curious list of things he photographed: the kidneys of a cat, the blood of a frog, the fronds of invisible plants floating in a drop of water, fleas, molds, pollen. Everything was new and fascinating. He was a scientific Gulliver exploring a land of Lilliput.

A few months after he had taken up his hobby in earnest, a paint manufacturer in Newark heard of his photomicrographs and brought him his first paying job. It was taking magnified pictures of

pigment particles. As the covering power of paint depends upon the size of the pigment particles, the manufacturer wanted to know how long he would have to grind pigment to reduce the particles to a certain size. Gravelle's photomicrographs told him and the check he sent in payment immediately went into the purchase of new equipment. Like a farmer plowing in fertilizer, Gravelle has continually plowed in the profits from his pictures to obtain new and better apparatus.

Many of the pictures of magnified objects you have seen in the advertising sections of leading magazines have come from Gravelle's home laboratory. One, illustrating the way shaving cream fills the spaces between the hairs of a beard, was run ten years ago and found to be such an effective display it was revived again this year. Gravelle was one of the first to take highly enlarged pictures of the cutting edge of a razor blade, showing how the beard nicks and chips the steel.

As a pioneer free-lance microscopist in industry, he has produced magnified pictures of silk, tobacco, soap, yeast, coal, milk, metals, pencils, pens, razor blades, mayonnaise, cod liver oil, ink, and a host of other commodities. He has helped turn out better newspapers by showing how the crystals cool in stereotyping plates and how the ink soaks into various kinds of paper. He has aided in textile manufacturing by revealing what happens to fibers in various weaves of cloth. In all, be has taken pictures or helped solve problems for more than 100 American concerns.

Once a silk manufacturer asked him to photograph the initial steps of a run in a stocking. The tiny, sub-visible breakages revealed by his photomicrographs helped the company turn out better stockings. In another instance, one of his pictures which magnified 2,000 times curious, polliwog-like particles in a rubber composition, played a big part in winning a million-dollar lawsuit. On several occasions, discoveries made in his laboratory have resulted in the introduction of new products or the altering of old manufacturing methods.

A few years ago, for example, a producer of plaster of Paris came to Gravelle with a mystery he couldn't solve. For nearly a decade, his product had been a leader in the market. Then the public had suddenly veered to a rival's brand. Experiments showed that it set more rapidly. Yet chemical tests revealed both plasters contained exactly the same ingredients. Gravelle adjusted his microscope, focused his camera, snapped his shutter and solved the mystery. The rival manufacturer was simply grinding his plaster into finer particles. By an easy alteration in factory methods, his client was able to restore his product to its former favor.

Among the thousands of photomicrographs you see on file in Gravelle's laboratory is one remarkable picture revealing how plaster of Paris sets. It shows clearly the mass of interlocking crystals that hold the plaster together. Another unusual print demonstrates the way a, drop of water may act as a magnifying lens in. miniature. It is a photomicrograph of raincoat material, the fibers under several water-drops appearing with added magnification.

At the time be was thus helping provide industry with a new eye, Gravelle was also engaged in an even more exciting adventure. In 1925, he joined with Charles E. Waite, John H. Fisher, and Col. Calvin Goddard, in establishing the Bureau of Forensic Ballistics, pioneer organization for tracing bullets to the guns that fired them by comparing the scratches on the lead left by the barrels. The technique he worked out, as the microscope expert of the bureau, is now used by scientific criminologists throughout the world. As an eloquent silent witness, his photomicrographs have figured in a number of celebrated murder cases, not only convicting the guilty but saving the innocent as well.

He joined with Charles E. Waite, John H. Fisher, and Calvin Goddard, in establishing the Bureau of Forensic Ballistics, pioneer organization for tracing bullets to the guns that fired them

Because a single variable element would upset the scientific accuracy of his photomicrographs and make it impossible for him to achieve the same results every time, Gravelle cooperated, several years ago, with engineers of the General Electric Laboratory in producing a new kind of lamp. The old arc light he used sometimes varied in intensity so he suggested a ribbon filament tungsten lamp that would overcome the difficulty and always provide the same intensity of light.

On several occasions, his home workshop has been turned into a movie set where actors too small to be seen by human eyes performed their parts. One reel, which has since been released as a teaching film, recorded the life cycle of the rotifer, that strange, sub-visible dweller in stagnant ponds. Another made for a manufacturer of surgical sutures, depicted the thrilling drama that takes place unseen within the human body when the blood corpuscles battle to the death with germs of infection. Three months went into the making of this film, 5,000 feet being exposed to obtain the final 500 used.

The hardest work Gravelle encounters is in taking pictures of the particles of a colloid solution. Before he can begin shooting, he has to disperse them in a film hardly thicker than the particles themselves. These bits of matter, whirling on microscopic orbits, are constantly in motion. This allows an exposure of only one twenty-fifth of a second although the particles are "kicked up" to a magnification of 1,500 diameters.

Rarely does he go beyond 1,500 diameters. Above it, he says, you get only "empty magnification." That is, you pull the lines a little further apart but obtain no additional detail. Incidentally, magnification refers to the number of times the *diameter* of an object is increased, not its *area*. An object magnified 1,000 diameters, increases in area 1,000,000 times. Older microscopists used to give the latter figure as it sounded more spectacular.

As Gravelle's apparatus accumulated, it became scattered all over the house. Finally, it was crowding out the furniture. Two and a half years ago, when building materials were at their lowest cost, he was able to realize a dream he had had for years. He built a laboratory addition to his home, a long room thirty-five by fifteen feet, extending into the garden.

In planning this ideal workroom, he first drew a floor plan to scale and then marked out, also in scale, all the pieces of apparatus that would have to go in the room. When he finished, he discovered the equipment was going to fill all the space and leave no place in which to walk around! So he had to extend the addition, increasing its length ten feet and its width five. The cost of the building was about $4,500. With the equipment it contains, it is valued at $20,000.

As you approach the laboratory, you pass from the living room of his home into a scientific library containing more than 3,500 volumes. Complete files of all the microscopical magazines run back to 1868. Practically every book on the microscope ever published is there. And

cabinets along one wall hold thousands of microscopic slides for tests and comparison. No two are alike and they cover a wide range of scientific fields.

In his workshop, some of the most effective apparatus he uses was designed and built. For instance, the vertical photomicrographic camera with which most of his work is done, is of his own design. It has a window in the side which enables him to focus on the ground glass much in the manner of a photographer using a reflex camera. Other products of the home workshop are an infinite variety of specimen holders and original gadgets for examining various materials.

One of the super-delicate machines which makes fine work possible is a microtome slicer. Each notch of its wheel represents 1/25,000th of an inch, increasing or decreasing the thickness of a section that much according to which way the wheel is turned. Razors, made of special steel and costing from $10 to $27 apiece, do the cutting. They are honed in unique racks to the finest cutting edge. The least dullness will pull delicate specimens apart.

I asked Gravelle how many pieces of apparatus he had. He answered honestly that he doesn't know.

At the far end of the laboratory is the darkroom. Fifteen by nine feet, it contains enlargers, contact printers; ferrotype racks, an electric fan that goes on automatically when the window is opened, chemicals, films, electric clocks, twelve kinds of darkroom lights, and even a radio that stutters when the front doorbell rings. Thus if Gravelle or Howard Somers, his assistant, are working alone in the room, they can tell if callers are at the door even if the radio is going.

About a year ago, the men were working late one night when they ran into difficulties which even their elaborate equipment was not prepared to meet. Turning on the water, they saw white sudsy liquid pour from the faucet. The water works, they learned later, had selected that late hour when few people would be using the water supply to dump in purifying chemicals. Afterwards, Gravelle avoided that hour in developing.

In 1924, less than ten years after he had looked through his first microscope, Gravelle was awarded the honor coveted by every photomicroscopist in the world, the Barnard Medal of the London Photomicrographic Society. Eight slides, together with the magnifications at which they are to be reproduced, are sent to each competitor for the medal. These magnifications run from two to 1,500 diameters. Each contestant gets the same slides, holds them two weeks and then sends them on to the next competitor. Gravelle sent them on to a man in Alberta, Canada. From there they went to another microscopist in Australia.

In this worldwide competition, the judges who examined the slides by arc light in London, selected Gravelle's work as the best. He was awarded the bronze medal with the diatom on its face which is symbolic of the highest achievement in photomicroscopy. It was the first time the medal was awarded outside of England and it is still the only time an American received it.

Besides his Fellowships in the Royal Microscopical Society and the Royal Photographic Society, Gravelle has been a Fellow of the New York Microscopical Society since 1919. He is also a member of the Queckett Microscopical Society, the American Microscopical Society, and the London Photomicrographic Society.

In the thrill of exploring the unseen and bringing back snapshots of the wonders it contains, he has found enduring satisfaction as well as achievement and honors. Seventeen years ago, he put on the magic glasses of the microscope. And he has been wearing them, entranced, ever since.

From an article by EDWIN TEALE
Popular Science, *December, 1934*
Supplied by Edwin L. Jones, Jr.

We've been waiting 58 years to welcome you to

http://www.mcclellan.af.mil/HO/39staff.jpg

Sacramento

Five Workshops. There's sure to be something for everyone in this diverse offering. The seminar opens early in the week with a joint DNA User's Group Meeting held with The National Institute of Justice (NIJ). On Wednesday, you'll have to choose from "Shooting Reconstruction" with Luke Haag, "Crime Scene Reconstruction" with Jerry Chisum, or "Management & Leadership Skills" with Van Richards. On Saturday, there's "Clandestine Laboratories: Response to Analysis" with Ed Smith and Trevor Wilson. Availability will be on a first come-first serve basis, so sign up early to reserve your spot.

As a special feature, we planned a special Two Hour Luncheon with bestselling author Steve Martini. You might know him as the author of *Undue Influence, Prime Witness, Compelling Evidence, The Simeon Chamber, The Judge,* or his newest book just released, *The List*.

Beg, borrow or steal something black and white to wear to our fun "Black and White Ball, which rounds out Friday's program. You won't want to miss this one—it will be held outside in the beautiful grove area of the Radisson. We'll have a live band (including a fellow CAC member!) *Find out first hand what fun it will be!*

Spring '97
Sacramento
May 27–31

Barnett, cont'd

people, in California or anywhere else in the country, to take the ABC Certification examinations. In spite of existing and impending regulation of DNA laboratories, only a few people from around the country have taken the ABC Forensic Biology certification exams in the past couple of years. Are we all waiting for governmental regulators to come up with something better than we have developed ourselves? How can we expect to have credibility if we are unwilling to demonstrate our competence? How can we avoid oppressive regulation if we are unwilling to participate in the certification programs that we ourselves have developed.

More and more public agencies are asking for compensation for their services. Are their clients supposed to take it on faith that the work is being done competently by qualified and competent criminalists? As private sector laboratories compete with public sector laboratories for the available forensic science resources, how are prospective clients to evaluate which laboratories they should use, and which they should not use? Without standardized educational curricula; uniform training practices; demonstrated mastery of the necessary knowledge, skills and abilities; and continuing, public monitoring of technical capability and performance, how can we expect our clients to give us much credibility?

The primary function of all of the professional organizations and activities I have discussed in my last three columns is to enhance the credibility of criminalistics and individual criminalists. These organizations, and their activities and programs, require the support of all members of the profession. Without it, we cannot expect to have the credibility we need, and that we think we deserve, to apply our "department of learning or science to the affairs of others."

e-mail: pbarnett@crl.com

Notice to Contributors

We publish material of interest to our readers and are pleased to receive manuscripts from potential authors. Meetings and course announcements, employment opportunities, etc. are also solicited. Advertisements are also accepted, although a fee is charged for their inclusion in *The CAC News*. Please contact the Advertising Editor for further information. Because of the computerized typesetting employed in *The CAC News*, submissions should be made in the form of MS-DOS compatible files on 3.5 inch floppy disks or by e-mail (70642.773@compuserve.com). Text files from word processors should be saved as ASCII files without formatting codes, e.g. bold, italic, etc. An accompanying hardcopy of the file should be submitted along with the disk to illustrate the author's preference for special emphasis. Graphics, sketches, photographs, etc. may also be placed into articles. Please contact the Editorial Secretary for details. The deadlines for submissions are: December 15, March 15, June 15 and September 15. **Nonmember subscriptions** are available for $24 domestic $30US foreign—contact the Editorial Secretary for more information.

FAMS, Inc, P.O. Box 832 Mahwah, NJ 07430-0832, USA, PHONE: (201) 818-1010 FAX:(201) 818-0086

Computer & Internet Crime Training for Law Enforcement

Two identical sessions will be given in series on the following dates: Session 1: Monday, April 7th - Wednesday, April 9th, 1997 Session 2: Tuesday, April 15th - Thursday, April 17th, 1997. At the Colony Hotel, Ballroom West, 1157 Chapel Street, New Haven, Connecticut, Phone: 1-800-458-8810

Day 1: $175 (includes tuition and materials), Day 2: $250 (includes tuition, materials and textbooks), Day 3: $250 (includes tuition, materials and textbooks), Instructors:Brent Turvey, M.S. Forensic Science and Eoghan Casey, B.S. Mechanical Engineering Email:

bturvey@connix.com

Or, Knowledge Solutions, 130 Montoya Drive, Branford, CT 06405, Phone (203) 483-0270.

Open to students and professionals of law enforcement, criminal justice and related disciplines. The courses are:

Day 1: Net 101 (max 30 students). The purpose of this course is to give students and professionals of law enforcement, criminal justice, and related disciplines a comprehensive overview of what the Internet is, who uses it, and what they use it for, with an eye towards law enforcement's specific needs and issues. The major components of the Internet, the main methods of communication on the Internet, the most common crimes on the Internet, and the extent of current law enforcement involvement on the Internet are all demonstrated and discussed.

Day 2: Net 102 + 201 (max 18 students). The purpose of this course and workshop combination is to give students and professionals of law enforcement, criminal justice, and related disciplines a practical understanding of the types of Internet crimes that exist, where they exist, and how to research them. Additionally, using live Internet connections, participants will be given the opportunity to use methods and techniques relevant to investigating suspected or proven criminal activity on the Internet. Topics covered will include anonymity, email crimes, obscene and indecent materials, child pornography, the PC as an extension of the crime scene, digital evidence collection and preservation, and using the Internet as an investigative tool.

Day 3: Net 201 (max 18 students). The purpose of this workshop is to give students and professionals of law enforcement, criminal justice, and related disciplines a hands-on opportunity using advanced methods and techniques relevant to investigating suspected or proven criminal activity on the Internet. Participants will learn how to connect crime on the Internet to crime in their communities. For complete course syllabi please see our web site at

http://www.connix.com/~bturvey/training.html

About the Instructors:

Brent Turvey received his Masters of Science degree in Forensic Science after two years of study at the University of New Haven under Dr. Robert Gaensslen & Dr. Henry C. Lee.

Eoghan Casey received his Bachelor of Science in Mechanical Engineering from the University of Berkeley, California, specializing in computer automation and bioengineering.

Lodging: New Haven, CT/The Colony, Cost:$85/night (specific information will be sent to course participants) The last day to register for Session 1 is Friday, March 28th, 1997. The last day to register for Session 2 is Friday, April 4th, 1997.

To register, please contact Knowledge Solutions via email, phone, or regular mail.

Openings in Tulsa

The Tulsa Police Department is seeking two Criminalists for the Serology/DNA section of the Forensic Laboratory. Preferred is a Master's degree with at least three (3) years' experience working in the serology or DNA section of a forensic laboratory. Responsibilities include the development of DNA analysis using D1S80 and STR and processing cases from evidence intake to court testimony. Salary range is $ 35,577 to $ 53,365. Contact: Carla M. Noziglia, Dir. Forensic Lab. Tulsa Police Dept., 600 Civic Center, Tulsa, OK 74103, 918-596-9128, cnozilia@ci.tulsa.ok.us

Following are two internet announcements—accuracy not verified

ASSISTANT TOXICOLOGIST

General Statement of Duties: Performs routine toxicological analyses of biological specimens, drugs, etc. submitted to the Toxicology Laboratory and assists higher level laboratory personnel in complex analyses; does related work as required.

Minimum Acceptable Training and Experience: A Bachelor's Degree in Chemistry, Toxicology, Biology, Med. Technology or related fields which must have included twenty credit hours of Chemistry and one year of recent experience in a Tox Lab (Clinical &/or Forensic Toxicology experience preferred.) or a Master's Degree in Toxicology, Pharmacology, Chemistry, Biology, Biochemistry, Med. Technology or related fields, which must have included twenty credit hours of Chemistry;

Salary Range: $37,350-$46,460

Contact: Thomas J. McGimpsey Dir. Admin. Services Westchester County Dept. of Laboratories & Research 2 Dana Road Valhalla, NY 10595 (914) 593-5555

C.N.Hodnett, Ph.D. Dir. Tox & For Sci Services cnh1@ofs.co.westchester.ny.us

ASSISTANT FORENSIC SCIENTIST

General Statement of Duties: Performs routine technical laboratory analyses of physical evidence submitted to a Forensic Science Laboratory; does related work as required.

Minimum Acceptable Training and Experience: A Bachelors Degree in Forensic Science, Chemistry, Biology, Clinical Laboratory Sciences, or Med. Technology which must have included twenty credit hours of Chemistry and one year of recent experience in a Forensic Science Lab or a Master's Degree in Forensic Science, Chemistry, Biology, Clinical Laboratory Sciences or Med. Technology which must have included twenty credit hours in Chemistry;

Recent experience in clinical serology may be substituted on a year for year basis for the above stated Forensic Science Laboratory experience.

Salary Range: $37,350-$46,460

Contact: Thomas J. McGimpsey Dir. Admin. Services Westchester County Dept. of Laboratories & Research 2 Dana Road Valhalla, NY 10595 (914) 593-5555

C.N.Hodnett, Ph.D. Dir. Tox & For Sci Services cnh1@ofs.co.westchester.ny.us

A Final Word

Did You Know?

Contributions to the CAC may be tax deductible as charitable contributions for federal income tax purposes. Your contribution will be acknowledged in the *CACNews. We gratefully acknowledge contributions from Dean Gialamas, Paul Sham, Michael Parigian and Marianne Stam.*

Raymond's ANAGRAM (ans. below)

How many four or more letter words can you make from the word: PRAGMATIC? I found 33

Spirits Trivia

Guy Snow of Harrisburg, N.C., writes that he thinks he can explain how Mendeleyev concluded that 40% by volume (80 proof) is the best proportion of alcohol for vodka (C&EN, Feb. 3, page 136). Mixing water with high-test alcohol is exothermic, Snow says, until the alcohol is sufficiently hydrated, which seem to be about 80 proof with vodka. If you gulp a shot of a higher proof, the mouth feels hot and dehydrated; thus you want the highest proof that does not cause this sensation. The phenomenon, Snow says, indicates that the best proof for some bourbon is 86, and for at least one scotch is 86.4.

Submitted by Bob Blackledge who suggests that certain crime laboratory studies confirm this theory.

En Passant—

Herman Meuron

It is with sadness that the CAC learned on September 25, 1996 of the death of Herman Meuron. Older CAC members will remember Herman as a criminalist with the Alameda County Crime Lab, and before that as a chemist with the Food and Drug Administration, and the Alcohol, Tobacco Tax and Firearms Division of the IRS where he retired as chief chemist. After his first retirement, Herman went to work for the Alameda Sheriff's Office and retired again in 1971. He moved to Hawaii, but returned from Hawaii on several occasions to attend CAC meetings. The first meeting he attended after his move to Hawaii in 1971 was the meeting at which Tony Longhetti assumed the office of CAC President. Herman announced at that meeting that he felt a special kinship with Tony and to commemorate his feelings he brought Tony a gift from Hawaii. That gift, a coconut, has become one of the venerable symbols of office of the CAC president. It has been passed from Longhetti to Dillon to Ragle to Thornton to Davidson to Morton to Bashinski to Chisum to Ogle to Rhodes to Tulleners to DeHaan to Murdock to Cooper to Norris to Springer to Goldman to Wiersema to Schwecke to Sidebotham to Matheson to Chisum to Gibbons to Hunter to me. Every time I saw Herman he would comment about how much he thought he, Tony, the coconut, and I had in common. He leaves a legacy as a public servant, a fine scientist, a dedicated professional, and an irrepressible wit—and a coconut. Those of us who have passed along the coconut, and who will pass it along in the future, could do no better.

Pete Barnett

V. Parker Bell

V. Parker Bell died suddenly on March 12, 1997 in La Jolla, California. An "In Memorium" article is planned for our next issue.

—Ed

Answers

ANAGRAM

mart, magic, part, pair, pram, pact, prig, pica, pita, prim, ramp, rapt, gram, grip, gait, grim, apart, crag, cram, cramp, crap, crimp, camp, carp, cart, tamp, tarp, trim, tram, trip, trap, tramp, tapir

Out-of-Towners

Top: Dr. Michael Baden, Dr. Bruce Weir, Doug Deedrick, Dr. Henry Lee.
Bottom: William Bodziak, Dr. Robin Cotton, Dr. John Gerdes, Herb MacDonnell

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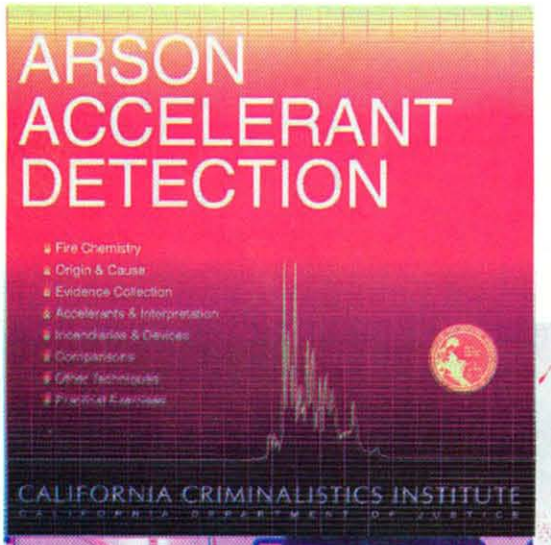
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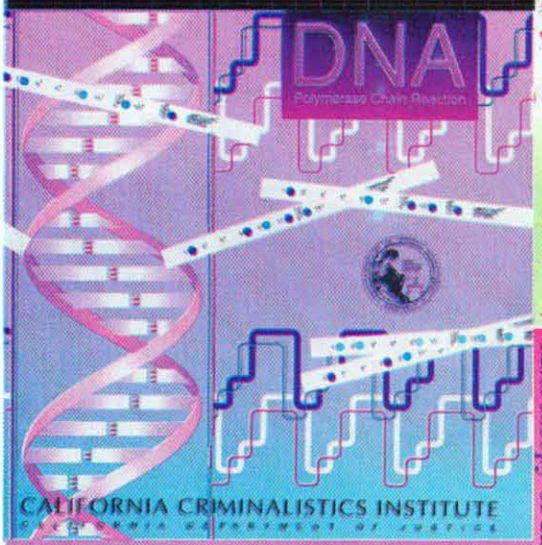
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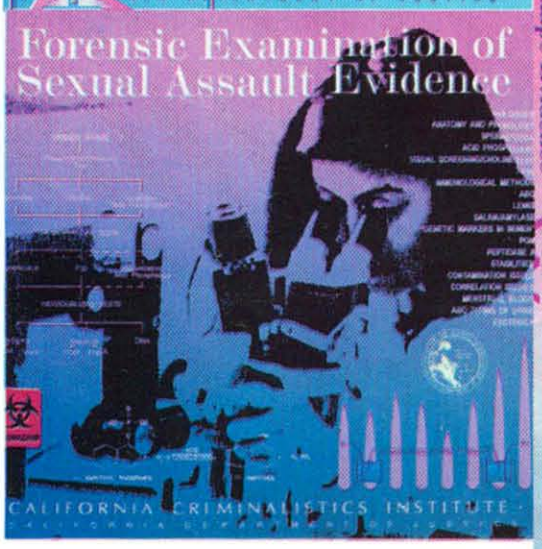
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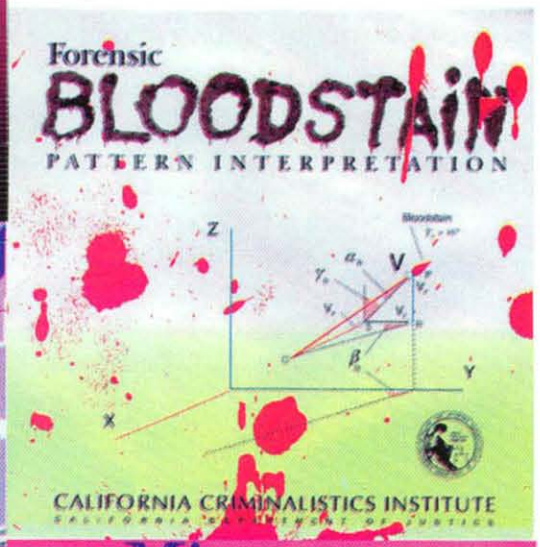
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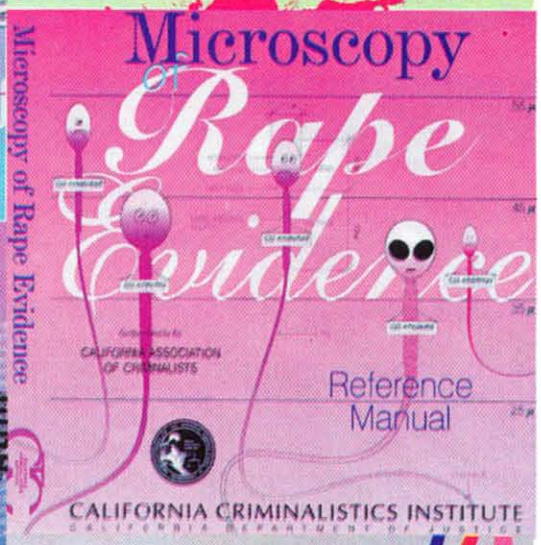
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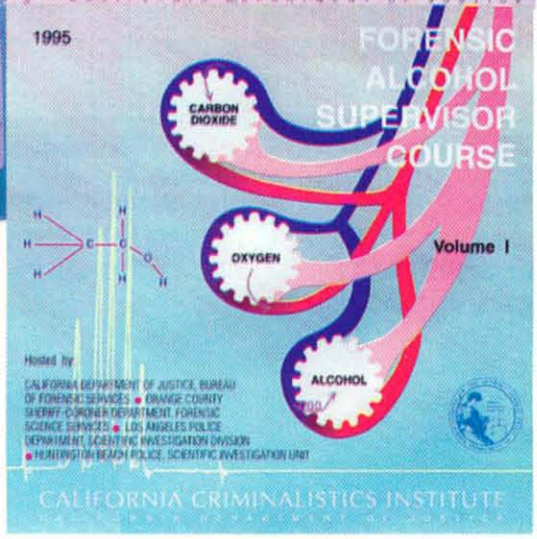
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