California Association of Criminalists NEWSLETTER

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Also included with this mailing:

1. Minutes of the Business Meeting, October 22, 1988
2. Minutes of the Board of Directors' Meeting, October 19, 1988

April 1989

CONFERENCES AND SEMINARS

SOUTHERN ASSOCIATION OF FORENSIC SCIENTISTS

May 4-6, 1989

The Spring, 1989, SAFS meeting will be held at the Radisson Plaza Hotel, Raleigh, North Carolina. The theme for this meeting will be "Scanning Electron Microscopy in Forensic Science." For further information, contact Lt. R.S. White, WV State Police Laboratory, 725 Jefferson Road, South Charleston WV 25309. (304) 746-2181.

CALIFORNIA ASSOCIATION OF TOXICOLOGISTS

May 4, 1989

The meeting will be held at the Westin South Coast Plaza Hotel, Costa Mesa CA. The hosts is Maureen Black. For further information, contact Lee B. Knight, CAT Vice President, Memorial Healthtech Laboratories, 701 E. 28th Street, Suite 113, Long Beach CA 90806. (213) 595-3427

ASSOCIATION OF FORENSIC DOCUMENT EXAMINERS

May 12 - 15, 1989

The Third Annual Symposium of the Association of FOrensic Docu ment Examiners will be held a the Red Lion Inn, Jantzen Beach, Portland Oregon from May 12 through May 15, 1989. For further information, contact John Posey, Program Chairman, 2136 Coloma Way, Boise ID 83712. Telephone (208) 384-6574.

CALIFORNIA ASSOCIATION OF CRIMINALISTS - SPRING SEMINAR

May 17 -20, 1989

The 73rd Semi-Annual Seminar of the California Association of Criminalists will be held at the Beverly Garland Hotel in Sacramento, California. The theme for the meeting is "A Century of Progress - 1888-1988." The meeting will include a special SEM session, panel discussions on professionalism and historic cases, and tutorial sessions on a variety of subjects: DNA, lasers, data systems, CCI library services, etc. For further information, contact Bureau of Forensic Services, California Criminalistics Institute, 4949 Broadway, Room F-104, Sacramento CA 95820. (916) 739-4380 FAX (916) 454-5433

CALIFORNIA ASSOCIATION OF TOXICOLOGISTS

August 5, 1989

This meeting will be held in northern California, but the meeting site has not yet been established, but it will be hosted by Bob Fogerson. For further information, contact Lee B. Knight, CAT Vice President, Memorial Healthtech Laboratories, 701 E. 28th Street, Suite 113, Long Beach CA 90806. (213) 595-3427

INTERNATIONAL SOCIETY FOR FORENSIC HEMOGENETICS

October 18 - 20, 1989

The 13th International Congress of the International Society for Forensic Hemogenetics will be held in New Orleans, LA, from October 18 through 20, 1989. For further information, contact .pa

Dr. Herbert Polesky, Memorial Blood Bank Center Minneapolis, 2304 Park Avenue South, Minneapolis MN 55404.

CALIFORNIA ASSOCIATION OF TOXICOLOGISTS

November 4, 1989

This meeting will be held in San Diego and hosted by Dick Shaw. For further information, contact Lee B. Knight, CAT Vice President, Memorial Healthtech Laboratories, 701 E. 28th Street, Suite 113, Long Beach CA 90806. (213) 595-3427

PAN AMERICAN ASSOCIATION OF FORENSIC SCIENCES

November 1989

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

INTERNATIONAL ASSOCIATION OF FORENSIC SCIENCES

October 24-31, 1990

The IAFS meeting will be held in Adelaide, Australia, in October, 1989. For further information, contact Dr. W. J. Tilstone, President IAFS, Forensic Science Center, 21 Divett Place, Adelaide SA 5000. (08) 226-7715 FAX (08) 224-0174

JOB OPENINGS

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

CRIMINALIST I
CRIMINALIST III

The Houston Police Department has several newly created positions at both the Criminalist I and Criminalist III levels. Both positions require a Bachelor's Degree in Chemistry, Forensic Science or a related field with a minimum of 40 hours in chemistry. In addition, the Criminalist III position requires four years experience in a forensic or crime laboratory. Start ing salary is based on the candidate's experience and qualifica tions. For additional information, contact City of Houston, Personnel Department - AC/CRIM, 500 Jefferson, 15th Floor, Hous ton TX 77002.

FORENSIC SCIENTIST 2
FORENSIC SCIENTIST 3

The Spokane laboratory of the Washington State Patrol Crime Laboratory has openings for experienced criminalists. The Level 2 position requires two years of laboratory experience, at least one of which is in a forensic laboratory. The Level 3 position requires either 2 years experience at the LEvel 2 position, or three years experience in a forensic laboratory. These positions are in the toolmark and firearm section of the laboratory. The salary ranges are $2,131 - 2,727 (Level 2), or $2,596 - 3,323 (Level 3). For further information, contact John F. Anderson, Washington State Patrol Crime Laboratory Division, 6604 Martin Way, PQ-11, Olympia WA 98504. (206) 438-7223.

CRIMINALIST
SENIOR CRIMINALIST

The Los Angeles County Sheriff's Department has several openings at the Criminalist and Senior Criminalist positions. Quali fications for the Criminalist position are a Bachelor's degree in Criminalists, Chemistry or a related field. The Senior Crimi nalist position also requires two years of experience in a foren sic laboratory. Experience in DNA manipulation is helpful, but not required. The salary ranges are $2,439 - 3,020 (Criminalist) and $3,102 - 3,948 (Senior Criminalist). For further informa tion, contact Harley Sagara, Sheriff's Department, Scientific Services Bureau, 2020 W. Beverly Blvd., Los Angeles CA 90057- 2494.

CRIMINALIST
ASSISTANT CRIMINALIST

The Oakland Police Department Criminalistics Laboratory has openings at the Criminalist and Assistant Criminalist level. The Assistant Criminalist position requires a B.S. degree in Criminalistics or a related physical or natural science. While no laboratory experience is required, some familiarity with drug identification or latent fingerprint identification is desirable. The Criminalist position additionally requires 2 years experience in a laboratory and familiarity with the theory and practice of criminalistics. Salary ranges are $3,368 - 3,726 (Criminalist) and $17.62 - 19.46/hr (Assistant Criminalist). For further information contact Office of personnel Resource manage ment, Room 136, 1417 Clay Street, Oakland CA 94612, or call Jan Bashinski, (415) 273-3386.

ASSISTANT FORENSIC TOXICOLOGIST I
ASSISTANT FORENSIC TOXICOLOGIST II

The City of San Francisco is seeking qualified candidates for Assistant Toxicologist positions within the Medical Examiner's/Coroner's Office Toxicology Laboratory. The minimum requirements for the Level I position are a baccalaureate degree in chemistry, biology or a related field; one year of experience conducting toxicology examinations or one year of graduate education; license or eligibility for Clinical Toxicologist - Technologist Title 17); and eligibility for a Forensic Alcohol Analyst license (Title 17). The Level II position requires three years experience and is a first level supervisor position. Salary ranges are $2,769 - 3,356 (Level I) and $3,123 - 3,785 (level II). For further information, contact Elaine Ochoa, Personnel Analyst, Civil Service Commission, City and County of San Francisco, Room 151 City Hall, San Francisco CA 94102. Telephone (415) 558-4715.

ANNUAL CAC SALARY SURVEY

Explanation of Codes

The President-Elect, whose has the awesome responsibility of preparing the annual salary survey neglected to include the key to the various retirement and benefit codes used in the survey which was distributted for the last newsletter. This oversight also escaped the attention of the Editorial Secretary, but you will not have him to kick around any more. These codes are printed below for the edification and possible amusement of our readers.

RETIREMENT
Safety State Peace Officer/Safety Retirement
PERS Public Employee Retirement Plans
Misc. Other Retirement Plans (Local Government Funded Plans)
Percent Percent of Salary Contributed by Employee to Retirement
Soc. Sec. Social Security Coverage (Yes or No)

ON CALL COMPENSATION
A. Not Requierd
B. Required & Compensated
C. Required & Not Compensated
D. Voluntary

OVERTIME COMPENSATION
A. Straight Time Off
B. Straight Time Pay
C. Time 1 1/2 Off
D. Time 1 1/2 Pay
D. None

MISCELLANEOUS BENEFITS
A. Life Insurance
B. Health Insurance Paid (% by Employer)
C. Dental Insurance Paid (% by Employer)
D. Association Dues Paid
E. Car - company
F. Research Time
G. Educational Leave
H. Educational Pay
I. Uniforms Paid
J. Pay and Travel to Professional Meetings
K. Annual Physical
L. Time off for Professional Meetings
M. Longevity Pay (%-after how many years)
N. Career/Educational Incentive Pay

JOB DESCRIPTION
NEXP - No experience needed
LEXP - Limited experience required - follow this with # of years
experience required i.e. LEXP-2
JNS - Full journeyman with no supervisory requirements
SCW - Supervisor also doing casework - indicate percentage i.e. SCW-25 or SCW-2

News about Our Members

This section of the Newsletter is designed to let other others within the Association know what our members have been doing - job changes, promotions, awards, or other activities that might be of interest to the members. Please send information to the Editorial Secretary.

Wool Standards Now Available

Dorothy Northey has offered to make available to any interested criminalist samples from her newly acquired selection of New Zealand wool standards. She has samples of cashmere, mohair, and cashgora. It would be interesting to determine if cashgora is a blend of Angora rabbit fur and cashmere sheep wool, a blend of Angora goat fur and cashmere sheep wool, or wool from a cross breed between Angora and Kashmir sheep. (Your editor has already eliminated the possibility that cashgora is fur from a cross breed of an Angora rabbit and a Kashmir sheep). For samples of these wools, contact Dorothy Northey at the Contra Costa Sheriff's Department.

DRUG STUDY GROUP

Ken Fujii

Contra Costa County Sheriff's Office

The San Mateo Police Department Criminalistics Laboratory hosted a Drug Study Group meeting on January 25, 1989. DEA Special Agent Sandy Smith described booby traps in and around clandestine drug laboratories. Numbers devices made from commercial, mili tary or homemade explosives and triggers were described. The devastating explosive power of flammable organic chemicals was emphasized. Copies of Modular Explosives Training Program, ATF P 4510.1 (12/76) were distributed.

ANNOUNCEMENTS:

The CCI library will acquire, on request, the journal articles cited by Professor J. Thornton in his bibliography Microcrystal line Tests for Drugs. The books and /or chapters of books cannot be acquired until the Library obtains some additional equipment.

An agent recently experienced a near fatal exposure to LSD at a clan lab scene. Lisa Brewer will present the circumstances at a future study group meeting.

JOBS WANTED

The following individuals are seeking employment as Criminalists. Prospective employers should contact these individuals directly.

Marguerite Murtagh is a recent graduate of Strathclyde University, Glasgow, Scotland, with a MSc in Forensic Science and is looking for a position as criminalist in the U.S. She has worked previously as an intern in the Los Angeles Sheriff's Department. She may be contacted at 30, Dobbin St., Armagh, Co. Armagh, N. Ireland BT61 7QQ. Telephone 0861-522524.

Julie Derby Jaesksch is a graduate of The George Washington University, Washington. D.C. with a M.F.S. Degree. She has over 4 years of laws enforcement experience as a Police Technician (Police Communications) with the Montgomery County Police De partment, Rockville MD. She may be contacted at 884 College parkway #T2, Rockville MD 20850. Telephone (301) 340-1778(h), or (301) 279-8000(w).

ALFRED REED MCLAUGHLIN

1919-1989

The California Association of Criminalists lost one of its staunchest supporters with the death of Alfred Reed McLaughlin, a Life Member of the association at Umpqua Oregon on January 9th of this year. He waged a long and courageous battle against a disease which many believe results from unreported hazards asso ciated with a chemical formerly used in presumptive tests for blood.

"Reed", as he was affectionately known by is many friends, re tired as a Sergeant of Police from the Los Angeles Police Depart ment in 1968, after over 25 years of service. His career with that department was within the Scientific Investigations Division, fifteen years of which he served in the Latent Print Sec tion, followed by four years in the Comparative Analysis Section and six years in the Questioned Documents Section. Reed had also served for two years in the United States Army, with assignment to the Criminal Investigations Division in Germany.

Following his retirement, Reed served as a staff consultant for the Institute of Forensic Sciences in Oakland, California and maintained an active consulting practice until shortly before his death.

For many years after his retirement from government service, Reed was a resident of Roseburg, Oregon and while the distance pre cluded as active participation in the CAC as he would have liked, he nevertheless continued an active research interest within his sphere of expertise. Reed was the author of seven articles in the Fingerprint and Identification Magazine and Investigation and Physical Evidence, published by Thomas in 1959. He was actively engaged in the preparation of a paper regarding opinion evidence and the basis for latent fingerprint identifications at the time of his passing.

Reed joined the CAC in 1960 and became a Life Member. He also had been awarded life memberships in the International Associa tion for Identification, (IAI), the California Division of Offi cers and the Indian Academy of Forensic Sciences. Additionally he held membership in the Forensic Science Society (England). Reed had served as President of both the California State Divi sion of the IAI and the Southern California Association of Fin gerprint Officers.

Reed assured his continued contribution to the profession with recent donations of a microscope to the Serological Research Institute of Richmond, California and of his professional library to the Paul L. Kirk Memorial Library at the University of Cali fornia, Berkeley.

The members of the association join in expressing our condolences to Reed's wife Virginia and his son Donald and family.

DJD
3/89

CERTIFICATION EXAMINATION INFORMATION

Dorothey Northey

Member, Board of Examiners

The first CAC Certification examination is scheduled to be given at the CAC Spring Seminar on May 17, 1989. That examination will result in a Certificate of Professional Competency in Criminalis tics being issued to the successful candidates. The next oppor tunity to take this examination will be in conjunction with the CAC Fall Seminar.

The necessary application forms and related materials may be obtained from and returned to:

Steve Renteria
Los Angeles Sheriff Crime Laboratory
2020 W. Beverly Blvd.
Los Angeles, CA 90012

The certification examination leading to a Certificate of Professional Competency in Criminalistics has been designed to cover the following

I. Evidence Collection

Knowledge to select and use the appropriate tools for recording and recovering evidence without loss, contamination, or changes that would result in the loss of information.

Knowledge of the evidence potential of various items and how to safeguard that potential by proper sampling and control collec tion.

Knowledge of the proper marking, packaging, and storage of evidence.

II. Evidence Preservation

Knowledge of the legal decisions relating to the preservation of evidence.

Knowledge of changes caused by time, temperature and biological agents and the means to retard or prevent such changes.

III. Evidence Examination

Knowledge of the types of measurements, procedures, and tests commonly used in the examination of physical evidence and the nature and significance of the information derived.

Ability to think logically and to design a testing protocol that will provide the most useful information while avoiding proce dures that are redundant, unnecessarily consumptive, or will interfere with subsequent tests.

Knowledge of the properties of commonly encountered evidence materials that allow their characterization.

Knowledge of limitations in personal skills and laboratory re sources and the potential contributions of other expertise.

IV. Safe Work Practices

Knowledge of the dangers associated with firearms, explosives, biological materials, and chemical substances and the proper methods for safe handling.

V. Use of Instruments

Knowledge of what instruments and equipment are used at crime scenes and in the laboratory including their applications and principles of operation.

Knowledge of which instrument to use based on the size and condi tion of the sample to be examined.

Knowledge of various isolation and separation techniques (chroma tography, electrophoresis, etc.) as required for sample prepara tion and/or application.

VI. Evaluation and Interpretation of Findings

Knowledge of the scientific method and general foundational basis for examinations, evaluations and interpretations.

Ability to understand and interpret technical data including any conditions or circumstances that could effect the conclusions.

Ability to recognize discrepancies or inconsistencies in analyti cal findings and determine their cause and significance.

VII. Report Writing

Knowledge of the purpose, method, and content of report writing.

VIII. Court Testimony

Knowledge of court decisions, procedures and associated legal terms applied to expert witnesses.

Ability to understand and respond appropriately to questions from counsel and/or the court.

IX. Knowledge of Ethical Standards and Conduct

Knowledge of the Rules of Professional Conduct.

X. Knowledge of current Developments and Literature in the Field

Knowledge of current criminalistcs information (via journals, books, newsletters, professional organizations, etc.).

Knowledge to critically evaluate new or old written or oral information as to its value (good vs bad science).

Knowledge of the foundational basis of criminalistics.

Sample Questions from the Certification Examination:

The following are sample questions of the type that you can expect to find on the examination.

1. A fingerprint in blood would be photographically enhanced using black and white film with a_____filter

a. copper sulfate
b. green
c. haze
d. K2

2. A single-action firearm is

a. inherently unsafe.
b. only capable of firing one shot before it must be reloaded.
c. one that must be cocked before it can be fired
d. something of historical interest only and is seldom encoun tered in criminalistics.

3. The instrument most commonly used for the identification of arson accelerants in the

a. absorption spectrophotometer
b. emission spectrophotometer.
c. gas chromatograph
d. x-ray fluorescence spectrophotometer.

4. The "Frye Test" refers to

a. Whether or not a scientific test meets certain legal standards
b. Whether or not a witness can testify.
c. absorption of arson residues on carbon for gas chromatographic analysis.
d. The temperature reached in a fire using the Kelly Pyrometer.

For those who are interested in preparing themselves for the examination, the use of the following study guide is recommended.

STUDY GUIDE for the examination leading to a CERTIFICATE OF PROFESSIONAL COMPETENCY IN CRIMINALISTICS

Prepared by the Certification Board of Examiners

For a good general review begin by reading

RULES OF PROFESSIONAL CONDUCT and ENFORCEMENT PROCEDURES supplied by the California Association of Criminalists.

FORENSIC SCIENCE An Introduction to Criminalistics, by DeForest, Gaensslen and Lee

(note: this book is, in its entirety, a good general text which has a particularly good appendix on the subject of photography)

For a more in depth treatment of various subject areas, supplement the above reading with the list of selections below. Give particular attention to those areas in which you may not have specific experience.

TECHNIQUES OF CRIME SCENE INVESTIGATION, Fourth Edition, by Fisher, Svensson, and Wendel

Chapter 2 "The first Officer at the Crime Science" Pages 18-29

Chapter 6: "Establishing Identity" pages 74-95. (Note: This is a particularly good treatment of fingerprints.)

Chapter 7: "Trace Evidence and Miscellaneous Materials" pages 146-149

Chapter 9: "Impression Evidence" pages 210-229.

Chapter 15: "Motor Vehicle Investigation" pages 388-397

CRIMINALISTICS - An Introduction to Forensic Science, Third Edi tion, by Saferstein
Chapter 12: "Forensic Serology" pages 319-320

Chapter 14: "Firearms, Toolmarks, and Other Impressions" pages 369-396

Note: There is no one book which has an adequate basic treatment of the subject of firearms. The citations above may be helpful but consultation of other

texts may also be necessary. You should have a basic knowledge of caliber, class and individual characteristics, types of firearms commonly encountered, types of ammunition and their component parts, gunshot residue and the significance of all of the foregoing. For an approach to fire arms examinations an article by Davis on "Firearms Training Notes" (AFTE Vol. 9, No.2 July 1977, pages 76-107 is suggested.

FORENSIC SCIENCE HANDBOOK, Volume I edited by Saferstein

Chapter 1: "Legal Aspects of Forensic Science" pages 2-27. (Note: this is a good discussion of this topic).

Chapter 4: "Forensic Glass Comparisons" pages 140-180 (Note: If supplemental, read pages 153-159 and 165-168.)

Chapter 5: "Forensic Identification and Association of Human Hair" pages 199-212.

Chapter 6: "Arson and Explosive Investigation" pages 225-237

Chapter 9: "Foundations of Forensic Microscopy" pages 417-490

(note: This reference is listed for convenience: however, any good general treatment of microscopy will suffice. What is selected should include parts of the microscope and their func tion, types of illumination, polarized light microscopy, and commonly encountered terms relating to this subject. For exam ple, another good text is "Polarized Light Microscopy" by McCrone, McCrone and Delly.)

Chapter 11: "Detection of Gunshot Residue: Present Status" pages 573-589

Chapter 12: "The Determination of Alcohol in Blood and Breath" pages 594-608

FORENSIC SCIENCE HANDBOOK, Volume II, edited by Saferstein

Chapter 2: "Forensic Capillary Gas Chromatography" pages 54-65

Chapter 3: "Forensic Identification of Controlled Substances" pages 69-121. (Note: This is a good discussion of this subject but, if supplemental, read pages 80-87)

Chapter 5: "Forensic Aspects of Textile Fiber Examination" pages 214-259.

Chapter 7: "The identification and Individualization of Semen Stains" pages 369-374

Chapter 8: "Firearms Identification" pages 394-450.

REPORT OF A SYMPOSIUM ON THE PRACTICE OF FORENSIC SEROLOGY 1987

A document sponsored by the Bureau of Forensic Sciences, The California Association of Criminalists. and the UNISYS Corpora tion

Topic 2: "The Recording, Collection and Preservation of Physio logical Stain Evidence" pages 26-35

Topic 5: "Interpretation and Reporting of Results" pages 57-88

PRACTICAL INSTRUMENTAL ANALYSIS edited by Krugers and Keulemans (note: Again, this book is listed for your convenience. Any book which gives a general overview of instruments commonly encoun tered in forensic laboratories will suffice. What is chosen should give you a basic understanding of laboratory instruments and typical applications thereof.

REFERENCES

Fisher, B.A.J., A. Svensson, and O. Wendel, Techniques of Crime Scene Investigation, 4th Edition, New York: Elsevier (1987)

Saferstein, R., Editor, Forensic Science Handbook, Vol. I, New Jersey: Prentice-Hall (1982)

DeForest, P.R., R.E. Gaensslen and H.C. Lee, Forensic Science An Introduction to Criminalistics, New York: McGraw-Hill (1983)

Report of a Symposium on the Practice of Forensic Serology 1987, Sponsored by BFS, CAC and UNISYS, Available from the California Association of Criminalists

Krugers, J. and A.I.M. Keulemans, (Editors), Practical Instrumen tal Analysis, New York: Elsevier (1965)

McCrone, W.C., L.B. McCrone, and J.G. Delly, Polarized Light Microscopy, Michigan: Ann Arbor Science (1978)

Rules of Professional Conduct and Enforcement Procedures, Avail able from the California Association of Criminalists

Davis, J.E. "Firearms Training Notes", AFTE, Vol 9. No. 2 July 1977 p. 76-107

Saferstein, R. Criminalistics - An Introduction to Forensic Science 3rd Edition, New Jersey: Prentice Hall (1987)

CAC MERCHANDISE

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

The current offerings are listed here. if you would like to see a particular product offered, contact John De-Haan (DOJ-CCI) or Sue Swarner (Contra Costa County).

Ties- at long last custom embroidered logo, navy or burgundy: $12.00

Sweatshirts- various colors (50/50 blend): $11.00, hooded $12.50

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

Mugs: Glazed ceramic mugs: $6.50

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

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

Golf Shirts (Hanes Cotton-Polyester, short sleeve): $15.50 Available in: black burgundy, slate grey, eccru, navy, kelly green, red, yellow, light blue, siler and white

Sweaters (long-sleeve acrylic pullovers): $17.50

Vest (sleeveless acrylic pullovers: $16.50

Sweaters or vests available in: black, brown, burgundy, tan (camel), light blue, red and navy. (100% Orlon available at extra cost)

Scarves High quality Polyester White with blue & red: $15.00

Forensic Science Society

Ties: Embroidered FSS motif: $6.50 (navy brown, burgundy) Woven multiple scale/microscope motif: $.500 (burgundy)

Plaques: $20.00

Pin Badges: $3.00

CRIMINALISTICS: AN EMERGING PROFESSION

Jan S. Bashinski

Oakland Police Department

455 7th Street

Oakland CA 94612

Despite its relative youth as a profession, criminalistics has made great progress in recent years toward developing a profes sional consciousness. The purpose of this paper is to examine the current status of the profession of criminalistics and to see how we are meeting the challenges of professional responsibility as a group.

The word "profession" and its derivatives "professional," profes sionalism", etc. are often bandied about. Likewise, "criminalis tics " is often applied somewhat loosely. Any discussion of the subject should begin with a clear definition of what one is talking about. Consider the following quote from the American Heritage Dictionary:

> "Profession: (1) occupation or vocation requiring training in the liberal arts or sciences and advanced study in a specialized field (2) the body of qualified persons of one specific occupation or field (emphasis added)".

It is a truism that profession defines itself. Criminalistics is no exception. The following CAC definition of criminalistics has been widely adopted:

> "Criminalistics is that professional occupation concerned with the scientific analysis and examination of physical evidence, its interpretation (emphasis added), and its presentation in court".

The genesis of this definition and much of the concept of crimi nalistics as a separate professional entity stemmed from the criminalistics program at U.C. Berkeley, started in the 1940's in the School of Criminology by Dr. Paul Kirk and shepherded today by George Sensabaugh and John Thornton in the School of Public Health. Many of the founders of crime laboratories and of gradu ate academic programs around the country had their roots in Berkeley and have spread Dr. Kirk's vision nationwide.

Criminalists, of course, includes many sub-disciplines, such as controlled substance analysis, trace evidence examination, physi ological fluid analysis, which are themselves grounded in the fundamental sciences, primarily chemistry and biology. A solid academic foundation in the sciences is a necessary prerequisite to the professional practice of criminalistics. But from the definition above, a profession requires the study of a special ized field. What is it about criminalistics that unifies it and sets it apart as a profession from other related scientific fields?

First is the nature of the scientific problems the criminalist must solve. A major task of the criminalist is to examine the scene of a crime or an object of evidence using scientific meth ods to try to reconstruct the event or answer an important ques tion. A common problem in the forensic sciences is the search for evidence of a connection or common source between items. This process of "individualization" requires not only the ability to analyze and identify something based on its composition, but also demands an appreciation of how unusual or unique its proper ties may be. The analytical samples themselves are uncontrolled and unpredictable, often minute in quantity and contaminated or degraded by the environment.

Second is the forensic arena in which the criminalist is expected to communicate the results of the scientific examination. Many other fields produce information which may ultimately find its way into a courtroom. However, in criminalistics the primary purpose of the laboratory examination is to produce a legally significant result, and every examination has likelihood of ultimately reaching the courts. The criminalist must not only be capable of conducting a competent analysis and writing a report but must also understand and be able to explain the scientific basis and significance of that analysis in court.

Criminalistics is a practical, applied field. This is not to say that fundamental academic research has no place nor to imply that the work does not require scientific rigor. However most often the profession modifies and evaluates methods developed in other fields to meet the demands of the types of samples encountered in evidence. Furthermore, the laboratory analysis, no matter how accurate, has no value if it is not directed toward significant investigative question. The criminalist must exercise scientific discretion as to which tests are appropriate for a given case circumstance. The criminalist must also have the ability to synthesize a number of observations and bits of data into a scientifically sound interpretation. In this regard the practice of criminalistics is quite analogous to the practice of medicine.

Recall the importance that the CAC definition of criminalistics attaches to the interpretation of physical evidence and compare that concept with the following definitions from the American Board of Industrial Hygiene:

"Professional experience involves having technical independence, responsibility and accountability. It includes evaluating and interpreting data, developing recommendations, preparing reports, and taking actions involving independent technical judgment."

"Technician - technologist experience generally is limited to routine activities under technical supervision without technical independence."

The same terms apply equally well to describe professional level work in criminalistics. Although a few crime laboratories uti lize the services of technicians for some restricted routine tasks, most practitioners are directly responsible for both the analytical work and the interpretation, reporting and testimony derived from that work. This is in stark contrast to the model in most clinical laboratories where the laboratory director, supervisor or physician interprets and assumes accountability for the analytical work done by technicians.

One reason for this may be the legal requirement that a defend ant have the right to confront all witnesses against him. It is rare that a laboratory director or supervisor will be allowed to testify to data developed by another individual. However, the major reason that the criminalist must function at the profes sional level is that sound scientific judgment and interpretation must be applied throughout the entire analysis process, beginning with the initial examination and evaluation of the evidence. Since the samples and case circumstances are not controllable, no amount of preordained standardization of approach can eliminate the need for scientific discretion in the particular case.

Given, then, that criminalistics is a profession, what are the responsibilities of its professionals, the criminalists, toward that profession? Those responsibilities are implied in the definition of a profession quoted at the beginning of this paper. They are to define the body of specialized knowledge which constitutes "criminalistics" and to establish a means of identifying the "body of qualified persons" who meet minimum standards of practice In other words, if we are to be considered a profes sion, we must establish and adhere to professional standards.

What is the appropriate arena for establishing professional standards? Obviously, the standards in a particular field are most appropriately set by the practitioners of that field, that is by the professional community that understands the needs and special requirements of its practice. In the case of criminalis tics, the professional community is best represented by the professional societies into which it is organized. The regional and national forensic science organizations must provide the forum and the leadership for the process.

We can learn from the experience of the other professions who have gone through this process before us. However, we should remember that approaches which work well in a profession organ ized differently than ours (e.g. clinical pathology) may not be the most appropriate in the crime laboratory context. Further, we should recognize that until we have clearly defined what the proper model is for our own profession, there will be a tendency to try to fill the void by imposing existing models from other professions whether or not they really fit.

The most visible manifestations of the maturation of a profes sion are its formal mechanisms for self evaluation and regula tion. These can be divided between those which deal directly with the qualifications and competence of the individual practi tioner and those which focus on the facilities and procedures of the institution in which the individual practices.

The regulatory mechanisms which deal with the individual practi tioner fall into two categories: Those which focus principally on ethical behavior and those which address primarily issues of technical competence. The ethical values of a profession are typically delineated in codified form and incorporate moral standards, such as honesty and trustworthiness.

Often the line between unethical behavior and technical incompetence is blurred. For example, at what point does a physician's failure to maintain his ability to provide the cur rent standard of care become gross negligence which could qualify as a betrayal of trust? For this reason the "codes of ethics" of many professions incorporate technical standards as well as moral ones and may more properly be termed "codes of professional conduct".

Those standards which cover the technical competence of the individual practitioner fall within the purview of certification, which has been defined in criminalistics by the Criminalistics Certification Study Committee as: " a voluntary process of peer review whereby a practitioner is recognized as having attained the minimum qualifications necessary to practice in one or more particular discipline of criminalistics."

Those standards which cover the institution are part of the process of accreditation, which for crime laboratories has been defined by the American Society of Crime Laboratory Directors as:

> "a voluntary process of external organizational review by which a laboratory may demonstrate that its management, operations, per sonnel, procedures and instruments, physical plant and security and safety procedures meet minimum standards."

Both certification and accreditation differ from licensure, which is a mandatory governmentally administered program which may cover either individuals or institutions. Licensure often builds on a voluntary profession based program, drawing on the standards

developed by the profession. For example, licensure of physi cians or lawyers by the state is based on written examinations and minimum qualifications which have been established by their professional peers in the Medical and Bar Associations. Accredi tation of hospitals and clinical laboratories is based on stand ards developed by the medical profession and inspections conduct ed by peer professionals. To the extent that a profession creates a viable and credible mechanism for self regulation, it has reasonable prospects for retaining some measure of control over its own fate when the public becomes interested in imposing governmental regulation.

Of the mechanisms that our relatively young profession has de veloped for self evaluation and review, crime laboratory profi ciency testing is the most well established. Begun experimental ly in 1975, the proficiency testing program has been administered since 1979 by Collaborative Testing Services under the auspices of the Forensic Science Foundation with the advice of a committee of the American Society of Crime Laboratory Directors (ASCLD). At present, more than half of the crime laboratories in the nation subscribe to one or more portions of this voluntary pro gram. Participation in this external proficiency test program provides a crime laboratory an opportunity to monitor the techni cal performance of its employees and to compare its results with other laboratories.

The American Society of Crime Laboratory Directors (ASCLD) creat ed a program of crime laboratory accreditation which was imple mented in 1981. The ASCLD accreditation standards and inspection process have many elements in common with programs for accredit ing hospitals, schools, and clinical labs. The process begins with a self evaluation against the accreditation standards by the applicant laboratory. This critical self assessment is, in many ways, the most valuable part of the process. Even if a laborato ry proceeded no further, it would have gained significant insight into areas of its operation which may need improvement. The heart of the process is an on-site inspection during which a team of trained inspectors examines the laboratory's facilities, equipment, and written technical and operating procedures, as well as interviewing the technical staff and reviewing case re cords. The applicant laboratory has up to a year to remedy any deficiencies before the final decision of the Board.

The ASCLD began developing its accreditation program shortly after the organization was formed in 1974. The ASCLD Laboratory Accreditation Board has been in existence since 1981. In the ensuing seven years, sixty three laboratories representing seven teen federal, state and local agencies have been accredited. This total represents approximately 20% of the nations's crime laboratories and is growing at a steady rate each year.

Progress in developing a program for certification of individu als has been more sporadic. A proposal for national certifica tion was made in 1980 by the national Criminalistics Certifica tion Study Committee (CCSC), based on a three year study of the issues conducted under the auspices of the Law Enforcement As sistance Administration (LEAA). This proposal did not receive support of the majority of the profession at that time, and the profession has yet to adopt a national certification program, although the concept has recently resurfaced with some prospect of success.

The lag between acceptance of accreditation and of certification is a reflection of a number of factors. First, laboratory manag ers who form the peer group for the accreditation process, are represented by one national organization, the ASCLD. Individual practitioners, on the other hand, are represented by seven re gional organizations, in addition to a number of national groups. Coordination of these various entities remains a problem.

Secondly, the diversity of the field presents a problem in de signing an appropriate testing process. By definition, certifi cation requires the establishment of a peer based consensus as to the scope of knowledge and nature of educational background which should be required of a "qualified person". Achieving that consensus will require considerable effort and leadership.

Several other forensic science professional associations have addressed the issue of professional standards in a variety of ways. The American Academy of Forensic Sciences sponsors certi fication in the fields of toxicology, forensic odontology, and anthropology. Document Examiners are certified by the American Society of Questioned Document Examiners and Latent Fingerprint Examiners by the International Association for Identification. The Northwest Association of Forensic Scientists operates a proficiency testing program. Serology training standards have been adopted by the Southern Association of Forensic Scientists and a firearms training program has been published by the Associ ation of Firearm and Toolmark Examiners.

More close to home, the California Association of Criminalists has also taken several significant steps toward defining profes sional standards. The first was the adoption early in the organ ization's history (1957) of a comprehensive Code of Ethics. The CAC Code contains many sections related to moral values. For example, the criminalist must not intentionally mislead the trier of fact and must not distort his interpretations to favor the side that employs him. However, most of the provisions of the code deal in one way or another with technical competence. The expert is expected to keep abreast of new developments in the field, to use reliable procedures, proper controls and represen tative reference materials and to be aware of the limitations of his expertise. Thus, the CAC Code is truly a code of profession al conduct.

In practice, application of those portions of the CAC Code of Ethics dealing with technical issues has been difficult. This has been due in part to the absence of well defined profession- wide standards against which to measure the performance or quali fications of individual practioners.

In recognition of the need for minimum qualification standards within the profession, the pivotal decision was made in 1986 to pursue the certification of individuals in general criminalistics and to create the CAC Certification Committee and Board of Exam iners. The goal of this process is to define those basic core areas which are foundational to the practice of the profession of criminalistics and to produce a written test by mid 1989. Certi fication in specialty areas may follow as time and resources permit. In accomplishing this goal, the CAC will have estab lished a model which could be followed by any other regional or national group desiring to develop a testing program.

Another pioneering event was the participation of the CAC in the 1987 Symposium on the Practice of Forensic Serology. This sympo sium brought together 92 practitioners to deliberate over working drafts of position statements prepared by five peer group commit tees on (1) quality assurance, (2) standards of training, (3) recording collection and preservation of evidence, (4)method validation, and (5) reporting and interpretation of results. After the symposium, the revised drafts were circulated to the profession for feedback. The result was the publication in early 1988 of a 100 page document which articulated the professional consensus on the current practice of forensic serology within the state. The serology symposium is an excellent example of a dynamic peer-based consensus building process which could serve as model for establishing and articulating professional standards in any of the sub-disciplines of criminalistics.

The most recent critical step was the decision by the CAC Board to send its representative to join with other regional associa tions as members of the American Board of Criminalistics, a national criminalistics certification board to be incorporated in the near future. As a result of this action, the CAC and the other regional organizations which support this national effort will be in a position to exercise leadership and control over the direction their profession will take in the future.

The growing interest and support for accreditation and certification demonstrates that our emerging profession is going through the natural course of evolution that others have followed before. We may differ among ourselves about the pace or the details of implementation, but we are moving as group in the right direction. By establishing and adhering to professional standards of practice we are, in essence, coming of age.

THE CAC'S ROLE IN ENCOURAGING PROFESSIONALISM AND PROFESSIONAL IZED MANAGEMENT: PAST, PRESENT AND FUTURE

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Although there are numerous books and discourses which define and describe professionalism and a profession, there is fairly strong consensus about some of the elements that surround these terms. One of the main elements that characterizes a profession is the requirement of advanced education, or expertise, usually acquired through in-depth study of abstract knowledge. This usually means a highly technical skill with a significant amount of speciali zation. Another major element of a profession is the acceptance of collegial standards of performance rather than the hierarchi cal standards of the bureaucratic institution. This is generally because the working knowledge required to police a technical specialty is not held by the traditional bureaucratic managers, but by the professionals themselves. A strong sense of ethics in the providing of service is also a hallmark of a profession. Part of that ethical concern is a commitment to be "true" to the profession and the client even over the institution if necessary. Another very important element to the professional is a high degree of autonomy in determining what work is done and how it is performed. The making of these decisions by those with the skill and knowledge to do so, rather than by those with only the hier archical status to do so, is a critical part of this process.

As a result of the elements described above, those who consider themselves professionals find they have a strong commitment to their field and their careers, often over their commitment to their employing organizations. They identify more strongly with fellow professionals than with their fellow (non-professional) workers or managers. Professionals tend to have their own personal motivation outside the needs of the company. They are often driven by their own sense of professional accomplishment and desire for achievement.

Criminalistics has the potential for all of the elements above, both those supplied by management which define the professional laboratory and those provided by the individual which create the professional worker. Many criminalistics laboratories do not possess any or all of the elements of a professional workplace and do not encourage professional behavior on the part of their employees. Many Criminalists do not display the elements of a professional and do not encourage professional management. It is certainly in the best interest of both groups and the "Profes sion" to look for solutions to this condition.

The California Association of Criminalists was first established, in large part, to address some of these very elements of profes sionalism. The CAC's By-Laws start out with a description of the purpose of the organization. The list includes an exchange of information, encouragement of developmental work, and other activities which add to the advanced education required by the field. It also encourages the establishment of standards for and by the practitioners, and Code of Ethics. And it seeks to en hance the recognition of the Association as a body which can help determine how work should be performed. Most if not all of the founders of the CAC were bench workers as well as lab managers (often because they were the only laboratory employee). So as they sought increased professionalism for themselves, they were doing so for the laboratory in general. As the field, the Association and the laboratories grew, this sense of profession alism was held together by the close working relationships of the still small number of laboratory personnel. These criminalists worked together to convince their parent organizations of the value and necessity of the elements required by their fledgling profession.

With the vast growth of Criminalistics in California in the 1970's, the job of Laboratory Director became a full time man agement position. No longer able to keep up with the expanding technology of a rapidly diversifying field and increasingly occupied with personnel and budget matters, many laboratory managers have lost the close association they once had with the profession itself. The directors of many laboratories, by choice or acquiescence, have conformed their management to traditional bureaucratic styles. These styles do not promote professional ism. They call for strong company loyalty and hierarchical au thority and decision making. Under these situations the true professional succeeds despite management NOT because of it.

An example of how more traditional bureaucratic management styles might frustrate professionalism can be demonstrated in the fol lowing hypothetical: Management is challenged if some of the workers in an

organization demonstrate inability to decide which work methods to employ and demonstrate poor performance with some methods. A traditional bureaucratic approach to the solution might be to restrict decision making at the worker level and eliminate particular methods as acceptable choices. Clearly, this solution does not encourage a more professional approach by the workers involved and serves to frustrate the efforts of workers who do not share their limitations. A more professional approach might include education and training in both decision making and in performance of the specific methods. It might also require more ongoing creative supervision in the handling of quality assurance for these workers. This in turn may require some additional training for supervisors. While the first approach is probably faster and more cost effective in the short term, the latter approach is much more effective toward the long term goal of ensuring quality work by capable individuals, and avoids the pitfalls of crisis management.

As the effects of more traditional management styles have been increasingly felt by the workers in criminalistics laboratories, the CAC has made little formal effort to examine or alter these conditions. The CAC's recent contributions to professionalism have been in the areas of training, standards and ethics. Study groups in various sub-specialties have been formed in an effort to promote training and education. In doing so, these groups have also provided some collegial standards (although often informally). Training sessions sponsored and/or coordinated by the CAC have also helped provide opportunity for increased exper tise. And the discussions of ethical issues both hypothetical and real have helped to strengthen the CAC's commitment to itself and to the clients its members serve (i.e. the criminal justice system). But the issues of management, decision making and autonomy have been largely left to managers and their organiza tions (e.g., CACLD)

To accomplish the goal of professionalism, the CAC must continue and expand its efforts in establishing the elements critical to this process. Training, in the form of study groups, confer ences, congresses, seminars, lecture series, etc. must continue and proliferate. Collegial standards must be more formally established and promoted. A giant step in this direction is the current effort in certification. Ethics and service to the justice system must remain vigorously defended goals. Perhaps most critically, the CAC must explore ways to encourage profes sional management styles that will promote professionalism among workers. Without the support of management, training will be difficult, certification will not be promoted, ethics and service may be ignored and professionalism will wane.

The CAC must focus management's attention on the benefit of maintaining a professional laboratory staff. One way to do this can be discovered by examining what would be the antithesis of a professional as defined by the elements already presented. Does any manager really feel his organization will be better served by a worker who does not have or is not concerned about advanced education and training; a worker who accepts the organization's standards of performance without regard for what is being done industry wide; a worker who does not feel a strong sense of ethical responsibility and sense of service to the criminal jus tice system; or a worker who does not want to make decisions, but must be told what to do and exactly how to do it? Is any organi zation going to provide better service with a staff that refuses to think for itself and fails to look for opportunities for improvement, a technician-like staff that can faithfully follow recipes but cannot handle a problem that does not have a pre- defined solution?

The CAC must also focus workers' attention on the values of pursuing their own professional development, and the associated responsibilities. The benefits of a more interesting, challeng ing, and rewarding occupation must be coupled with a reasonable expectation of self motivation, dedication and sacrifice. Pro fessionalism and its benefits must be considered rewards of their sincere pursuit not favors bestowed as a condition of employment.

Management and workers must realize that attainment of true professionalism is a joint achievement. It is a symbiotic rela tionship whereby the employing organization, the manager and the worker all benefit, and thus the criminal justice system bene fits. Some ways in which the CAC and management organizations might cooperate to achieve this goal could include joint consid eration of minimum professional operating standards. Such stand ards might include a minimum percentage of a budget that must be allocated to ongoing education, a minimum amount of time allotted by the organization and donated by the worker in the pursuit of training or other professional endeavors or the maximum amount of time a worker should be given to become certified and what the organization must do to help him prepare for it. In general, standards which help define what is reasonable to give and to expect from professionals. Perhaps some of these standards might become required for laboratory accreditation. Other ways the CAC might support professionalism is by supporting and/or coordinat ing training in professional management along with some of the management organizations.

Without some kind of cooperation and commitment on the part of both workers and managers, professionalism will not become full fledged. And the alternative could be laboratories full of technicians, automated instruments and robots, all of which are provided with operating programs, cannot think, cannot handle anything outside of the routine and which do not require techni cal or professional managers.

THE DUQUENOIS REACTION AND PHENOLS OF THE CANNABINOID AND NON- CANNABINOID TYPE

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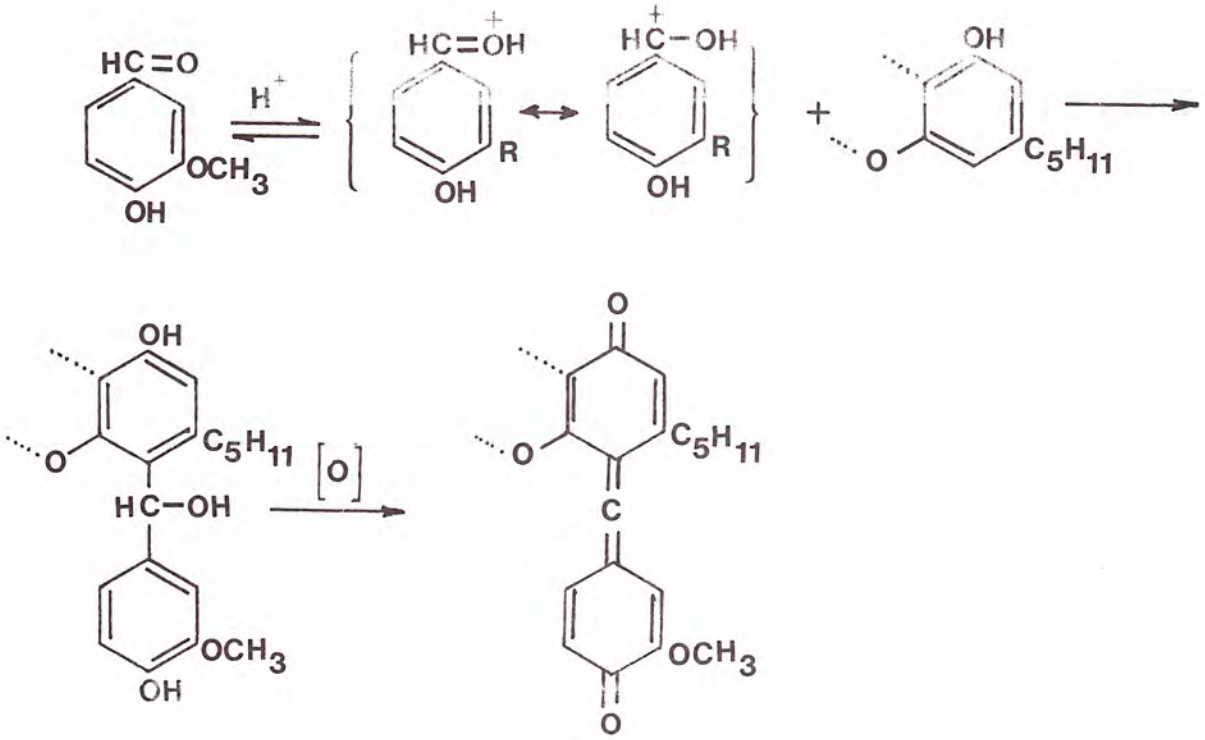
In the past decade or so, considerable progress has been made in the isolation and identification of materials from Cannabis sativa. If one counts positional and double bond isomers, more than 60 cannabinoids have been isolated [1], along with 20 nitrogeneous compounds, 18 amino acids, 34 saccharides and amino sugars, 50 hydrocarbons, 7 alcohols, 12 aldehydes, 13 ketones, 20 aliphatic acids, 13 esters and lactones, 11 steroids, 103 terpenes, 19 flavanoidglycosides, and 19 non-cannabinoid phenols.

Both cannabinoid and non-cannabinoid phenols are of forensic interest, given the nature of the Duquenois reaction. Under the acidic conditions of the Duquenois reaction, the aldehyde of vanillin is protonated, making it a stronger electrophile and promoting substitution on the undissociated cannabinoid phenol at ortho- and para- positions to the phenol [2]. The product then undergoes oxidation to a highly-colored quinone complex of indefinite composition.

The Levine modification of the Duquenois reaction, in which the color is extracted into chloroform, requires an aliphatic chain of at least 2 carbons [3], a criterion met by all the major and most, but not all, of the minor cannabinoids. This aspect of the Duquenois reaction is, however, solely a function of the aliphatic

Figure 1. Mechanism of the Duquenois Reation



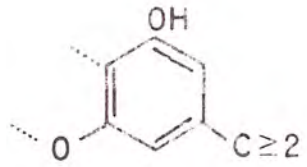
group on the 5-carbon of the cannabinoid, and is unrelated to the chemistry of the phenolic group.

A material which would give an intense color with the Duquenois reagent, and which would extract into chloroform, would therefore have the structure shown in Figure 2. Relative to the phenol, at least one of the ortho- or para- positions must be free, and the aliphatic chain at the 5- position must be two or more carbons in length. In the discussion following, this structure is the criterion taken for Duquenois test reactivity.

sion following. They may be found in the references to the original literature, however. Alternatively, the present authors will supply the structures upon request.

The requirements for the formation of a color--any truly intense color--with the Duquenois reagent are an aromatic phenolwith an open ortho- or para- position open. These requirements are met by each of the six spiroindan phenols, by cannabidihydrophenanthrene, by all but one of the 4 dihydrostilbene phenols, and by the two simple phenols. (The three phenol methyl ethers will be unreactive, since the

Figure 2. Structural Requirements for the Duquenois/Levine Test



It is entirely appropriate to ask the question, "In the Duquenois Test, what is it in Cannabis that is reacting with the reagent, and are there other (non-cannabinoid) phenols that give the same reactivity?" With respect to the cannabinoids, most samples of Cannabis are likely to have tetrahydrocannabinol or cannabidiol as the principal cannabinoids [4], and furthermore, under the strong acid conditions of the Duquenois test, cannabidiol undergoes ring closure to tetrahydrocannabinol. This has offered additional intrinsic appeal to the Duquenois test, since the material tested for is the material responsible for the psychopharmacological activity associated with Cannabis.

That is, unless the non-cannabinoid phenols are giving the same type of reactivity as the cannabinoid phenols, or unless the same reactivity is given by a farrago of minor cannabinoids. It is this issue that is being addressed in the present work.

NON-CANNABINOID PHENOLS

The 19 non-cannabinoid phenols found in Cannabis include 7 spiroindan phenols, 4 dihydrostilbenes, 3 dihydrophenanthrenes, 2 simple phenols, and 3 phenolmethylethers. To conserve space in this publication, the structures are not illustrated in the discus-

phenolic functional group is necessary for the phenol type, as opposed to the terpene type, of reactivity.

However, to say that each of these of these materials will likely give a color with the Duquenois reagent is not to say that the reactivity of each of these materials will mimic the reactivity of tetrahydrocannabinol to the extent that these phenols would be mistaken for cannabinoids. It has long been recognized that eugenol gives a muddled color with the Duquenois reagent, in which an initial yellow eventually shifts to a green, but with no extraction into chloroform. Isoeugenol gives the same reaction as eugenol. (The isomerism of iso-eugenol is not a positional isomerism on the aromatic ring, but rather a double bond isomerism on the three-carbon chain which is para- to the phenol; the Duquenois test is blind to this aspect of the chemistry). None of the materials listed above have the aliphatic chain which forces the color toward the blue-violet end of the spectrum, as opposed to the red end of the spectrum as seen with aromatic mono- and di- phenols. And none of the materials listed above have the aliphatic chain which is responsible for the extraction of the color into chloroform.

Table 1. Expected Reactivity of the Duquenois-Levine Test with Non-cannabinoid Phenols

Phenol	Color Expected	CHCl3 Extraction Expected
Spiroindan phenols		
Acetylcannabispirol [5]	+	-
Cannabispiradienone [6]	+	-
Cannabispirol [5-7]	+	-
Cannabispirenone A [5,8,9]	+	-
Cannabispirenone B [10]	+	-
Cannabispirone [8,9,11]	+	-
Iso-cannabispiran [12]	-	-
Dihydrophenanthrene phenol		
Cannabidihydrophenanthrene [6]	+	-
Cannathrene 1 [13]	+	-
Cannathrene 2 [13]	+	-
Simple phenols		
Eugenol [14]	+	-
iso-Eugenol [14]	+	-
Phenol ethers		
cis-Anethol [14]	-	-
trans-Anethol [14]	-	-
Methyleugenol [14]	-	-
Dihydrostilbene phenols		
3-[-2-(4-hydroxyphenyl)ethyl]-5-methoxyphenol [10,15]	+	-
3-[2-(3-hydroxy-4-methoxyphenyl)-ethyl-5-methoxyphenol [10,15]	+	-
3-[2-(3-isoprenyl-4-hydroxy-5-methoxy-phenyl)ethyl]-5-methoxy-phenol [10]	+	-
Canniprene [15]	+	-

CANNABINOID PHENOLS

The reactivity of the Duquenois test with major cannabinoids has been described frequently in the literature; the reactivity of most of the minor ones has not. However, the designation of a cannabinoid as being a "minor" cannabinoid is necessarily an arbitrary one, and one can easily run afoul of terminology. Cannabinol is not a minor cannabinoid, but the 5-butyl analog (which has no other name) certainly is. Tetrahydrocannabinol is a major cannabinoid, but certain of its variants would be considered minor cannabinoids by any rational criteria. Rather than to agonize over the precise designation, the present writers have chosen to include all of the cannabinoids, minor and major, in the following discussion.

If one scrutinizes the structure of the cannabinoids for the reactivity that is associated with a color--any color--with the Duquenois reagent, and with the subsequent extraction of the color into chloroform, the predicted reactivity may be assessed. This is shown in Table 1. It should be understood that no laboratory work was done in this regard; this was a review of the reactivity based solely on the structure of the compound. The authors did not have access to, for example, cannabiglendol, 10- oxo-tetrahydrocannabinol, cannabiripsol, or cannabichromanon. In this discussion, the terpene system is used for the number of the double bonds in the various tetrahydrocannabinols.

Table 2. Expected Reactivity of the Duquenois-Levine Test with Cannabinoids

Cannabinoid	Color expected	CHCl3 Extraction expected
D^6-*trans*-Tetrahydrocannabinol [16]	+	+
D^6-*trans*-Tetrahydrocannabinol acid [17]+ (Note 1)	+	
D^1-*trans*-Tetrahydrocannabinol [18]	+	+
D^1-*trans*-Tetrahydrocannabinol acid A [19,20]+ (Note 1)	+	
D^1-*trans*-Tetrahydrocannabinol acid B [21,22]	+ (Note 1)	+
D^1-*trans*-Tetrahydrocannabinol-C4 [23]	+	+
D^1-*trans*-Tetrahydrocannabinolic acid-C4 [23] +	+	
D^1-*trans*-Tetrahydrocannabidivarin [24,25]++		
D^1-*trans*-Tetrahydorcannabidivarinic acid [26,27]	+	+
D^1-*trans*-Tetrahydrocannabiorcol [28]	+	-
D^1-*trans*-Tetrahydrocannabiorcolic acid [23]	+ (Note 1)	-
Cannabidiol [29-32]	+	+
Cannabidiolic acid [33,34]	+(Note 1)	+
Cannabidiol monomethylether [35]	+	+
Cannabidiol-C_4 [23]	+	+
Cannabidivarin [36,37]	+	+
Cannabidivarinic acid [27]	+ (Note 1)	+
Cannabidiorcol [28]	+	-
Cannabinol [38-42]	+	+
Cannabinolic acid [43]	+ (Note 1)	+
Cannabinol monomethylether [44]	-	-
Cannabinol-C_4 [23]	+	+
Cannabivarin [45,46]	+	+
Cannabiorcol [28]	+	-
Cannabielsoin [44]	-	-
Cannabielsoin-C_3 [47]	-	-
Cannabielsoic acid A [48]	-	-
Cannabielsoic acid B [48]	-	-
Cannabielsoic acid B-C_3 [47]	-	-
Cannabicyclol [49-52]	+	+
Cannabicyclolic acid [53]	+ (Note 1)	+
Cannabicyclovarin [54]	+	+
Cannabipinol [51]	+	+
Cannabichromene [55,56]	+	+
Cannabichromenic acid [57]	+ (Note 1)	+
Cannabichromevarin [58]	+	+
Cannabichromevarinic acid [27]	+ (Note 1)	+
Cannabigerol [59]	+	+
Cannabigerolic acid [43]	+ (Note 1)	+
Cannabigerovarin [58]	+	+
Cannabigerovarinic acid [27]	+ (Note 1)	+
Cannabigerolic acid monomethylether [60]	? (Note 2)	?
Cannabigerol monomethylether [61]	+	+
Cannabinodiol [62-64]	+	+
Cannabinodivarin [62]	+	+
Cannabiglendol [65]	+	+
Cannabitriol [66-68]	+	+
Dehydrocannabifuran [62]	-	-
Cannabifuran [62]	-	-
Cannabichromanon [62]	+	+
Cannabichromanon-C_3 [45]+	+	
Cannabicitran [69]	-	-
10-oxo-Tetrahydrocannabinol [64]	+	+

D^1-*cis*-Tetrahydrocannabinol [70]	+	+
Cannabicumaronone [71]	+	+
Cannabiripsol [72]	+	+
Trihydroxy-D^1-Tetrahydrocannabinol [72]	+	+
3,4,5,6-Tetrahydro-7-hydroxy-alpha,alpha-2-trimethyl -9-n-propyl-2,6-methano-2H-1-benzoxocin-5-methanol [73]	? (Note 3)	?
10-Ethoxy-9-hydroxy-tetrahydrocannabinol [68]	+	+
9,10-Dihydroxy-D-9-tetrahydrocannabinol [74]	+	+
8,9-Dihydroxy-D-9-tetrahydrocannabinol [74]	+	+
Cannabidiolic acid tetrahydrocannabitriol ester [75]	+	+

Note 1 - With any of the acids of the cannabinoids, one of the sites, (whether ortho- or para- to the phenol), is occupied, and is therefore unavailable for substitution by the protonated aldehyde of vanillin. The reactivity in these instances may be a bit less than with the parent cannabinoid, but the difference will ordinarily not even be noticable. The acids do react.

Note 2 - This compound is probably weakly reactive. One of the phenolic groups is an ether, and the position ortho- to the one remaining phenol is occupied by a carboxyl. The color would be expected to extract into chloroform, however, because of the aliphatic amyl side chain.

Note 3 - This is a truly weird compound in which the 3- position has undergone ring closure with the terpene moiety. There is still another phenol at the 6-position, which would promote Duquenois reactivity if this phenol does not undergo cyclization and it probably doesn't because, unlike cannabidiol, it is saturated. On balance, the chemistry suggests that the compound would in fact give a color with the Duquenois reagent and would extract into chloroform, but the present writers are not altogether sanguine concerning this.

SUMMARY AND CONCLUSIONS

The non-cannabinoid phenols are not likely to contribute significantly to the Duquenois reaction, although many of them can be expected to give some color prior to the chloroform extraction; none of the non-cannabinoid phenols reviewed here have the structure necessary for the Levine modification of the test.

An entirely different situation is encountered with the minor cannabinoids, however. Most of the minor cannabinoids can be expected to react with the Duquenois reagent, and all but a few can be expected to extract into chloroform. The Duquenois test cannot, therefore, be interpreted as a test for the pharmacologically-active material in Cannabis. It is, rather, a test for the olivetol (5-amylresorcinol) moiety that is common to most cannabinoids, major and minor.

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STATEMENTS OF CANDIDATES FOR CAC BOARD OF DIRECTORS

Candidate Statement for the Position of Treasurer

Debbie Wakida Madden

I have served on the C.A.C. Board of Directors as REgional Direc tor during 1983. I was the chairperson for the Spring 1983 Seminar that was held in San Francisco and have also organized and helped host monthly dinner meetings since I have been with San Francisco. I have also served on CAC committees and current ly am serving on the Seminar Committee.

I think that I have the organizational skills to take on the challenge of the office of Treasurer. My past experiences in organizing dinner meetings and especially the May 1983 Seminar were very useful as teaching tools in the art of financing and money management.

Candidate Statement for the Position of President

Eston Schwecke

My background includes working for the Office of the Chief Medi cal Examiner-Coroner County of Los Angeles, the Los Angeles Police Department and the Huntington Beach Police Department/ The total experience I have in the field is fifteen years. I have a B.S. in Biological Sciences from the University of South ern California and a M.S. in Criminalistics from the California State University at Los Angeles. I have been a member of the CAC foe eight years and for three of those I served on the Board of Directors in the position of Southern REgional Director. In addition, I have served the organization as Seminar Chairman for the 1987 7th Semi-Annual Seminar. I am also a member of the American Academy of Forensic Sciences, American Society for Mass Spectrometry, California Association of Crime Laboratory Direc tors and the National Criminal Justice Association.

As President, I would like to see additional benefits to the members. Among these benefits would be additional efforts in the area of certification, providing or supporting training courses and political involvement on crucial issues. CAC has given the profession a rich legacy. To continue this tradition we need to reach out in new arenas. To encourage professionalism we must continually strive to be at the forefront of advances in our filed. Additional bonds need to be made with private industry to encourage development of products for our use. Since CAC is the foremost regional forensic science association it requires dedi cation of the President. I am willing to give that dedication.

Candidate Statement for the Position of Editorial Secretary

Jim Norris

The primary duties of the Editorial Secretary involve the pub lishing of the quarterly CAC Newsletter and the maintenance of the Association's mailing list. At the present time, these two duties require a knowledge of "desktop publishing" (for the newsletter and other Association publications) and "database management" (for the maintenance of the mailing list). I am familiar with both of these areas of microcomputer use and have, for a number of years used the same computer programs, in these areas, which are used by the current Editorial Secretary.

I would hope as Editorial Secretary not only to continue the publication of the Newsletter in the fine tradition of the cur rent incumbent, but also to attempt to expand the Association's Newsletter into more of a "journal"

I have had nine years of experience serving on the Board of Directors and have held the offices of Regional Director, Member ship Secretary and President

Candidate Statement for the Position of Treasurer

Jim White

I am running for Treasurer because I feel that my experiences in this area will assist the CAC in control of its finances. I have prior experience as CAC Treasurer (1973/74) and I have 10 years experience as Treasurer of a larger non-profit educational corpo ration, the Orange County United Nations Association/ UNICEF Gift Shop (Yes, Virginia, there is a UN presence in Orange County !). This experience has given me familiarity with general bookkeeping procedures and with the government forms that are necessary to file annually.

If elected to this position, I will supply the Editorial Secre tary with semi-annual reports for inclusion in our newsletter and the Board will be given up to date written reports at every meeting.

Publications

The following publications are available from the CAC. These are available at the CAC table at our semi-annual seminars. For further information, contact John DeHaan or Susan Swarner.

Forensic Science Foundation:

Explosion Investigation, Yallop $25.00

Science Against Crime, Kind/Overman $15.00

Eight Peak Index of MS $65.00

Measurement of Breath Alcohol $13.00

Bibliography on Ethyl Alcohol, Holleyhead $25.00

Sources and Origins $8.00

The Scientific Investigation of Crime, Kind $55.00 (special CAC price)

The Controlled Substances Act: A Resource Manual of the Current Status of the Federal Drug Laws, Alexander Shulgin $25.00

CAC:

CAC Policy Manual, complete with By-Laws, Officer Duty Statements, CAC Policy Statements, Ethics Enforcement Procdure with Binder: $20.00

Index to CAC Seminars - free to members, $10.00 to non-members.

CAC Abstracts (with index, in a three ring binder with the CAC logo) - $25.00 for members, $50.00 for non-members

BFS - CAC - UNISYS Forensic Serology Symposium Report - $15.00 (available from the Editorial Secretary)

Three Ring Binders: Blue & Grey with CAC Logo: $10.00