

1949

Police Science Technical Notes and Abstracts

Follow this and additional works at: <https://scholarlycommons.law.northwestern.edu/jclc>

 Part of the [Criminal Law Commons](#), [Criminology Commons](#), and the [Criminology and Criminal Justice Commons](#)

Recommended Citation

Police Science Technical Notes and Abstracts, 39 J. Crim. L. & Criminology 802 (1948-1949)

This Criminology is brought to you for free and open access by Northwestern University School of Law Scholarly Commons. It has been accepted for inclusion in Journal of Criminal Law and Criminology by an authorized editor of Northwestern University School of Law Scholarly Commons.

POLICE SCIENCE TECHNICAL NOTES AND ABSTRACTS

Joseph D. Nicol*

Academy of Forensic Science—Dr. R. B. H. Gradwohl, Chairman, announces the appointment of the following committees to carry on the developmental work of the Academy of Forensic Science. *Constitution Committee*: Dr. LeMoyné Snyder, Chairman, Dr. Alan R. Moritz, Dr. Milton Helpert, Dr. Israel Castellanos, J. W. Holloway, Dr. Alexander S. Weiner, Clark Sellers, C. M. Wilson, and Sidney Schatkin. *Membership Committee*: Dr. E. J. Umberger, Chairman, Dr. W. J. R. Camp, Edward Burke, Ray Pinker, and George W. Keenan. *Publicity and Publications Committee*: Prof. Ralph F. Turner, Chairman, Dr. Lowell S. Selling, Sidney Kaye, Dr. E. J. Umberger, and Dr. Frank R. Dutra. *Time, Place, and Program Committee*: Dr. A. W. Freireich, Chairman, Dr. Herbert S. Breyfogle, Dr. R. N. Harger, Dr. C. W. Muehlberger, Orville Richardson, Prof. Donald F. McCall, Dr. Val Satterfield, and Prof. Wilton M. Krogman. (Submitted by R. F. Turner, Secretary, Mich. State College.)

Helicopter in Police Work—*Spring 3100, 19:34 (Oct., 1948)*, has announced the addition of a helicopter to the New York Police Department Aviation Bureau. In addition to regular patrol flights this new plane will prove valuable in searches for stolen or missing boats and for air-sea rescue work. This brings the bureau's air arm to four airplanes.

Periodicals Concerning Pharmacognosy and Pharmacology—A list of periodicals in the fields of pharmacognosy and pharmacology has been prepared by G. M. Hocking and is available from S. B. Penick & Company, 50 Church Street, New York 7, N. Y.

Defense Shooting With a Hand Gun—The important features of "snap" or defense shooting are discussed in the *F.B.I. Law Enforcement Bulletin*, 18, 2-5 (Jan., 1949). The article is illustrated.

Comparison of X-Ray Diffraction Patterns—The comparison of evidence and standards by X-ray diffraction is facilitated by a technique developed by C. L. Christ, E. F. Champayne, R. B. Barnes, and C. F. Salzman. This method, as reported in *The Review of Scientific Instruments* [19:872-8 (Dec., 1948)], utilizes a motor driven specimen holder, arranged so that the standard and unknown are alternately placed in the X-ray beam. The diffracted X-rays are detected by a Geiger counter X-ray diffraction photometer, the output of which is fed through a motor driven double pole-single throw contactor to a recording potentiometer. By properly synchronizing the motion of the specimen holder with the closing of the contactor and the peak of the X-ray tube voltage, maximum output is obtained. The recording, as described, represents the two samples qualitatively and quantitatively.

Training Course in Police Science in Missouri—The University of Missouri in cooperation with the Missouri State Highway Patrol recently

*Firearms Identification Technician, Chicago Police Sci. Crime Det. Lab.

launched a state wide program of training for law enforcement officers of Missouri. The program was officially initiated when the annual Missouri Law Enforcement officers' training conference was conducted on the University campus from November 29th through December 4th. The conference will be followed by training schools in the various communities of Missouri. The duration and the subject matter to be presented at these schools will depend on the local needs.

The purpose of the program is to make available to sheriffs and their deputies, police officers, prosecuting attorneys, and other law enforcement officers of Missouri classroom and field training in the practical phases of police work, traffic aspects, identification, crime prevention, public relations, and scientific criminal investigations.

The instruction is being conducted under the supervision of the school of law and the division of adult education and extension service of the University. The State Highway Patrol is participating by furnishing some of the instructors and assisting in planning of the training program.

At the training conference forty-six hours of intensive instruction in police science were given. The information imparted to the officers in the various classes was given by means of lectures, sound movies, slides, demonstrations, and exercises. "Take home" material such as abstracts of the lectures, note, outline, critiques, forms, and photographs were furnished. The majority of the training was of a practical nature, working on simulated crimes and hypothetical cases. Among the most popular courses of instruction was the practical firearms practice on the University pistol range.

Certificates from the curators of the University of Missouri were awarded thirty-five officers who completed the conference training. The curators also plan awarding certificates to those officers who complete the courses of instruction at the community training schools. (Submitted by G. J. Koch, Jr., University of Missouri.)

A General Account of Micro-Chemical Methods in Forensic Investigations—The earlier methods of diagnosis of poisoning were very limited, depending very largely on observations before and during illness prior to death, together with post mortem appearances.

The development of toxicology was in some measure restricted and controlled by the advances in modern chemistry and reliable analytical methods; these developments fall into three phases (a) the detection and recognition of poisons by their physiological effects and observations made at post mortems; (b) the detection and isolation of the poison; (c) the quantitative estimation of, and distribution of the poison within the body with the view to ascertainment of total amount taken and period involved.

Modern medicine has become an applied science and its progress closely interlocked with progress in chemistry. Many substances used in medicine are scheduled poisons and when taken in excess, produce fatal results. The discovery and use of highly powerful toxic substances, the amount required to produce fatal results being correspondingly small, the methods of detection and estimation become difficult. In such cases highly specialized technique has had to be developed involving microchemical, colorimetric, electrometric and nephelometric methods.

It would naturally follow that toxicological investigation has passed from the province of the medical man to the chemist and in many cases to a chemist highly skilled in microchemical technique.

In many toxicological examinations the amount of parent material is relatively great (viscera, etc.), in relation to the substance sought, hence in obtaining the final material micro-physical methods have frequently to be used, e.g., fractional extractions, crystallization, distillations, sublimations, selective absorption, followed in some cases, by elusion with selective solvents.

With the ever-increasing flood of narcotic drugs on the market, the problems confronting the forensic chemist have increased. Some drugs break down or modify in the body, hence in endeavoring to obtain a value for the total amount taken, decomposition or modified products also have to be determined. (The paper upon which this abstract is based was read by Dr. J. B. Firth, F.R.I.C., M.I. Chem. E., Director of the North-Western Forensic Science Laboratory, Preston, England, at a symposium on Micro Chemical Methods in Forensic Analysis at Leeds University, and was abstracted and submitted by the author.)

Micro Methods in Forensic Toxicology with Particular Reference To The Barbiturate Drugs—The ever increasing introduction of new proprietary medicinal drugs presents a formidable problem for the forensic toxicologist. During processes of metabolism, these drugs may be degraded and conjugated in the tissues, and evidence as to the nature of an administered drug can frequently only be obtained by identification of these modified products. Invariably, the isolated material which may amount to only a few miligrams, is mixed with brown, gummy tissue extractives, and thus for the processes of purification and identification microtechniques are a fundamental necessity.

Drugs of the barbiturate group are increasingly prevalent in causing suicidal and accidental deaths. Their identification in the small amounts in which they are commonly encountered in toxicological analyses presents considerable difficulty, due essentially to the fact that structurally individual members of the group are closely similar. Systematic schemes of identification previously described have frequently been found unsatisfactory in practice; colorimetric procedures have relied upon orange and brown end-point colors, an undesirable feature as the products isolated from viscera are seldom perfectly pure; crystal tests have in general been somewhat tedious and laborious in operation.

A systematic micro-chemical procedure has been evolved [Turfit, *Quart. J. Pharmacol.*, 21:1-9 (1948)] which permits a complete identification of all clinically important barbiturate drugs available in this country. The process is designed in a series of simple and rapid separate stages: (1) Purification of crude residues prior to identification; (2) preliminary identification of isolated material as a barbiturate compound; (3) color reactions; (4) crystal tests. A final check on the identity is provided by a micro mixed melting point. In many instances, several of the tests may be omitted if identification is accomplished without their inclusion.

Purification of the residues is usually accomplished without loss by charcoal treatment in ether solution, but in difficult cases this may be followed by microsublimation, or precipitation by acid from a concentrated alkaline solution. The micro melting point taken at this stage is a useful sorting test, although it may well be 5°-10° low.

The preliminary identification as a member of the barbiturate group, two reactions are used: (1) the well known Co-NH₄OH test; (2) heating

with $\text{H}_2\text{SeO}_3/\text{H}_2\text{SO}_4$. Neither of these is itself entirely specific, but positive results with the two tests is presumptive evidence of a barbiturate.

No single color reaction has been found to characterize all the barbiturates, but four simple tests, viz. vanillon/ H_2SO_4 ; $\text{H}_2\text{SeO}_3/\text{H}_2\text{SO}_4$; p-dimethylamine benzaldehyde/ H_2SO_4 ; resorcinol/ H_2SO_4 provides an almost complete identification of all members. (Ed. note: Tables of colors accompany article.)

Crystal tests are performed in two stages: (1) Crystallization on a cavity slide from ether solution; (2) addition of 50% H_2SO_4 to a solution of this residue in 2N NH_4OH . The microscopic appearance is compared with standard photomicrographs, as with controls on authentic specimens.

Each of the tests described requires only 0.01-0.1 mg. of material, demands the use only of readily available chemicals and apparatus, and may be performed in a very short time interval. The accumulated results give a clear identification of any one of the eighteen barbiturate drugs investigated. The conclusion may be checked if quantity of material permits by a micro mixed melting point. (Submitted by G. E. Turfitt, The Metropolitan Police Laboratory.)

Arsine Poisoning—Industrial Medicine, 17:208 (June, 1948), contains a description of R. A. Wilks' work with a case of arsine poisoning. He found negative arsenic (As_2O_3) in all parts of the body except the lungs (0.06 mg). The anatomical analysis indicated acute arsine poisoning with marked destruction of red blood cells, anoxemia, and anemia; urinary suppression; hemoglobinuria; and pulmonary adema. These conditions resulted from three-hour exposure to arsine gas.

Spectrographic Determination of Lead in Blood—W. A. Patterson relates his experience in utilizing the spectrograph in the determination of lead in blood. This material, contained in the *Canadian Chemistry and Process Industries*, 33:239-42 (March, 1948), is not original but may be helpful to those wishing to use a similar technique.

The Value of Routine Toxicological Examinations in Postmortem Investigations—H. C. Freimuth points out the value of routine toxicological examinations in connection with autopsy, particularly routine tests for alcohol, carbon monoxide, and barbiturates. In an article in the *Southern Medical Journal*, 41:838-40 (Sept., 1948), Freimuth states that many poisons do not produce characteristic pathologic lesions and their presence in the body can be demonstrated only by chemical methods of isolation and detection.

Isopropyl Alcohol Intoxication—W. M. McCord, P. K. Switzer, and H. H. Brill, Jr., observed three cases of isopropyl alcohol intoxication and concluded that isopropyl alcohol produced coma at much lower blood concentration (150 mg/100) than ethyl alcohol. Otherwise, the actions of the two alcohols are similar. Their treatment of the patients consisted of gastric lavage, fluids as indicated, and symptomatic therapy. These cases are recorded in the *Southern Medical Journal*, 41:639-42 (July, 1948).

Poisoning by Sodium Nitroprusside—A suicide by use of sodium nitroprusside is reported by H. J. Walls in the *Analyt*, 73:615-6 (Nov.,

1948). Thiocyanate was found in the urine, HCN determined in the stomach contents, and nitroprusside determined colorimetrically in the stomach contents. The esophagus was congested and swollen, and "the cardiac end of the stomach shows congestion, mucosal swelling, and numerous small submucosal hemorrhages." Some odor of almonds to stomach contents.

The Micro-Determination of Beryllium—A sensitive and specific procedure for the recovery and estimation of beryllium in biological materials has been described in the *Analyst*, 73:607-13 (Nov., 1948), by W. M. Aldridge and H. F. Liddell. This method utilizes the ability of aluminum phosphates to collect beryllium at high pH in the presence of large amounts of calcium. A weighed sample is digested with 2 ml. of conc. sulfuric acid and 2-5 ml. of conc. nitric acid on a sand bath until SO₃ fumes appear. Cool, evaporate twice after adding 2 ml. H₂O, add 1 ml. of 10% potassium ferrocyanide, dilute to 15 ml., let stand 1-12 hours in darkness. Centrifuge, pipette 5 ml. into 15 ml. tube, add 0.5 ml. of 2.63% potassium alum and 1 ml. of sat. disodium phosphate and 3 drops of bromeresol green. Make alkaline (green) with NaOH, allow to stand, and centrifuge. Decant, add 0.5 ml. of 1% NaCl and suspend precipitate, add more NaCl and centrifuge. Repeat washings and drain precipitate. Add 0.08 ml. of N NaOH. Add tri-sodium phosphate buffer, dilute to 5 ml. and add 0.2 ml. of dye reagent (0.15 g of Naphthochrome Green G acid in 100 ml. of alcohol containing 1 ml. of N HCl). Compare with 5 ml. of trisodium phosphate blank in photo-electric instrument. A decrease in green is measured. Where large amounts of calcium are present, such as in bone samples, the results are less reliable.

Tool Mark Engravings and Impressions—Inspector J. A. Churchman, writing in *Royal Canadian Mounted Police Quarterly*, 14: (3) (Jan., 1949), discusses the principles employed to evaluate the chances of another tool to produce a similar mark or striation. In his laboratory studies, Churchman found that each individual striae reoccurred a maximum of once in five tools. Factors involved and the computation of the probability of concurrence are explained. Relative subjects are illustrated with photomicrographs. (Submitted by Charles W. Zmuda of the Chicago Police Scientific Crime Detection Lab.)

Studies of Detection of Deception—F. L. Rouke and J. F. Kubis report in *The American Psychologist*, 3:255 (July, 1948), that "when the number of records deemed necessary by an experienced examiner were obtained from each subject, the psychogalvanic reflex proved a reliable and highly valid index of deception." When only two records were run the analysis was "not sufficiently accurate for practical use."

Ability of a Graphologist to Detect Psychotic Individuals—Since some weight still seems to be placed upon the opinions of graphologists to judge personality from handwriting, both in commercial credit fields and in criminal areas, G. R. Pascal and B. Suttell endeavored to determine the degree of validity of determinations of normal and abnormal individuals from handwriting. They selected ten psychotic individuals and ten normal individuals of equal age, sex, and educational background and submitted identical writings from the twenty to a graphologist who claimed ability to differentiate normal from abnormal by handwriting

analysis. The results were only slightly better than chance. This research is reported in the *Journal of Personality*, 16:192-97 (Dec., 1947).

Establishment of Ownership of Shoes—The ownership of shoes suspected of making particular prints at several burglaries was established by the footprint technician of the Royal Canadian Mounted Police Laboratory at Ottawa by examining the interior of the shoes and correlating foot shape, infection scars and other peculiarities of the foot with the shape and condition of the shoes. The details of the investigation are related in the *Royal Canadian Mounted Police Quarterly*, 14:144-7 (Jan., 1949).

Softening of Skin After Immersion in Water—*The Royal Canadian Mounted Police Quarterly*, 14:154-5 (Jan., 1949), cites a case in which a lactic acid-phenol solution softened the skin on the fingertips of a drowned man sufficiently to enable finger prints to be taken. The solution consisted of four parts, lactic acid, phenol, glycerine, distilled water. After twenty days immersion in the solution the skin was removed and prints taken.

NEW PRODUCTS

EDITOR'S NOTE: It is the purpose of this additional service to the readers of the Journal to call their attention to new products deemed helpful in police fields. Data presented will be abstracts of the manufacturer's literature or reports of demonstrations. Only those products considered most suitable to police science will be included. The mention of any product in this Journal, however, is not to be construed as a recommendation by the Journal.

Precision Reflex Camera—The Hasselblad Precision Reflex Camera is designed for flexibility with interchangeable lenses from 55 mm. to 254 mm. The camera will accommodate roll film magazines in 120 size and cut film holders in $2\frac{1}{4} \times 2\frac{1}{4}$ inch size. This allows a wide latitude of interchangeable emulsions. Shutter speeds from one second to 1/1600 seconds are provided by a focal plane shutter. Two separate wiring systems provide synchronization for flash bulbs and speed lights. The camera weighs 2 lbs. 14 oz. with an 80 mm. lens. At present the Hasselblad camera is made in Sweden with Eastman Kodak Ektar optics and will be sold in America by the Willoughbys Camera Store, New York City.

Phase Microscopes—The American Optical Company offers phase microscopes and accessories which facilitate study of transparent material of inherently low contrast. Complete phase microscopes as well as objectives and diaphragms for adapting existing microscopes for phase microscopy are available. Illustrations in the American Optical Company's catalog indicate that the phase microscope is an aid in seminal stain investigations.

Portable Transceiver—The Citizens Radio Corporation of Cleveland, Ohio, has announced the development of an eleven ounce battery operated transmitter and receiver operating on the 460-470 megacycle band. The range of the equipment depends upon the terrain and weather conditions, varying from several hundred feet to sixty miles (from an airplane). Complete with batteries each unit weight $2\frac{1}{4}$ lbs. and may be transported in a leather carrying case when not in use.