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Police Science Technical Abstracts and Notes

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POLICE SCIENCE TECHNICAL ABSTRACTS AND NOTES

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Identification of Amidone—The identification tests for amidone, a synthetic substitute for morphine, are described by J. A. Schuldiner in the *Analytical Chemistry*, 21: 298-300 (Feb., 1949). The tests consist of the formation of crystals with zinc chloroiodide, potassium bromobromide, potassium iodoiodide, mercuric bromide, Marme reagent, and cadmium iodide. Precipitating agents were prepared for macrotesting, namely, cobalt thiocyanate (2.0% sol. in H₂O), bromine water (sat. sol.), ammonium hydroxide, Mayer's reagent, sodium hydroxide (1.0% in H₂O) and lime water (sat. sol.). A table which accompanies the article shows the effects of these reagents upon amidone, demerol, morphine sulphate, codeine sulphate, heroin hydrochloride, cocaine hydrochloride, procaine, dionine, and narceine. Since amidone "causes and supports addiction, it may be classified as a narcotic."

Medium Review of Analytical Chemistry—*The Analytical Chemistry*, 21: 3-173, 196-285 (Jan. and Feb., 1949), contains the First Annual Review of Analytical Chemistry which should prove helpful in guiding police technicians in their choice of new techniques to solve analytical problems. Forty topics are scanned with extensive bibliographies accompanying each article.

The Use of the Mass Spectrograph in Arson Cases—The extremely small quantity of volatile liquid recovered from fire residue by Farrell's vacuum distillation method¹ make comparisons with standard samples virtually impossible by ordinary analytical means. However, the ability of the mass spectrograph to analyze these small quantities of volatile material establishes it as an ideal instrument for arson cases. The mass spectrograph requires a very small sample for an analysis of complex mixtures. Limited space does not permit an exhaustive explanation of the principles of mass spectrometry. It will be sufficient to say that where light spectroscopy segregates light according to wave-lengths, mass spectroscopy separates matter according to mass and degree of ionization. In most cases in police work it is unnecessary to identify each constituent; it is sufficient to say that when subjected to a refined and controlled analysis the standard and questioned samples react the same. Thus, if the standard and evidence are subjected to the same conditions in a mass spectrometer and the resulting mass distributions are equivalent then it can be said that they may have had a common source. At the present time this instrument is financially beyond the reach of the police laboratories; however, those universities and oil companies which are equipped with mass spectrographs might be amenable to running tests in important arson investigations.

Microscopic Identification of Caffeine—*The Journal of the Association of Official Agricultural Chemists*, 31: 163-4 (1948), contains an article by G. T. Keenan in which he describes a microscopic test for caffeine.

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¹ This JOURNAL, 33: 433-9 (Nov.-Dec., 1947).

This test consists of mixing a drop of the test material with a drop of Lugol's Reagent (iodine in potassium iodide) on a microscope slide. A few small fragments of ammonium sulfate are then added, and the periphery is observed as the drop evaporates. If caffeine is present numerous dark red to brown, to almost black quadrilateral plates will appear, many showing box-like habit. They resemble rhombohedra in form and exhibit strong birefringence with crossed nicols.

Axial Bullet Engravings—A study was made of the rifling impressions on bullets with particular reference to those striations parallel to the axis of the bullet. W. W. Sutherland concluded that the striations which he observed and called "X-striae" were made by the lead in the barrel. It was also his observations that these lines possessed unique patterns and were suitable for identifying the gun that made them. Although his work and remarks are confined to automatic pistols, the same results may be observed on bullets fired from revolvers in the areas left by stripping of the bullet as it enters the barrel. Sutherland's article appeared in the *Royal Canadian Mounted Police Quarterly*, 13:259-63 (Jan., 1948).

A New Method for Comparing Fired Bullets—Where it is desirable to make a casting of the surface of a bullet or cartridge case the method, described by Onni Takke in the *Finger Print Magazine*, 15-17 (Sept., 1948) may be of some service. The technique consists of coating the surface with a thin layer of graphite and then electroplating carefully until a strong sheet of metal is deposited. This layer is then removed and represents a negative of the original surface. Since it would prove time consuming it is obvious that this system will not replace the comparison microscope where a sizable volume of work must be handled.

Characteristics in Signatures of Cooley Rifles—J. A. Churchman has sounded a well timed note of warning to all firearms technicians concerning broached barrels. Since many arms are now being rifled by broaching it would be advisable for all firearms technicians to read the original article. In the *Royal Canadian Mounted Police Quarterly*, 13:133-40 (Oct., 1947), Churchman points out that barrels broached in succession by the same broach (in this case the H. W. Cooley Company uses six separate broaches on each barrel) have lines in the groove impressions which are similar. It is necessary to resort to relatively high magnification (50x) in order to find the accidental lines necessary for a positive or negative determination. The article is illustrated with excellent photomicrographs.

Society for the Advancement of Criminology—The organization of persons engaged in teaching criminology and police science in universities and colleges has been announced. This new group has been called the Society for the Advancement of Criminology and was formulated at Berkeley, California in December, 1948. Its officers for 1949 are O. W. Wilson, President; William Dienstein, Vice President; and, V. A. Leonard, Secretary-Treasurer. It is limited, in the main, to those actively engaged in teaching criminology.

Micro-Analysis Using X-Ray Diffraction Technique—A semi-cylindrical powder camera is described in the *Analyst*, 73:326-30 (June, 1948), by H. P. Rooksby. It has a six centimeter radius and is capable of producing suitable diffraction patterns with specimens less than a milligram in weight. Thin tissue paper supports the specimen in front of the collimator. Analysis of surface coatings is possible by employing a reflection technique.

Phase Microscopy in Seminal Stain Examination—The new phase microscope has many uses in crime detection laboratories and should be considered when the purchase of new optical equipment is contemplated. This instrument is of particular value in the examination of seminal stains involved in various sex offenses. Dried semen on clothing is extracted by soaking a small piece of fabric in water on a microscope slide and tearing apart the fibers with dissecting needles. After a short interval, the fibers are removed and a cover slide applied. No biological stain is used, and the water is not evaporated from the slide. Spermatozoa are readily apparent if either bright or dark phase objectives are used. The microscope is of great value, since it makes the preparation of the sample very simple and rapid. In addition, spermatozoa can be detected at lower magnification than is necessary when using an ordinary microscope; thus, the search for sperm cells can be completed much more rapidly. (Submitted by David Q. Burd.)

Writing Inks in Use Today—The writer recently obtained three sets of 100 or more envelopes from three business organizations—two banks and the general offices of a national manufacturing company. Chemical tests were made on the writing ink of each envelope to determine the character and class of inks in use in homes and business concerns. The following tabulation shows the percentage of each set which fell into the classifications listed.

| <i>Class of Ink</i> | <i>Bank A</i> | <i>Bank B</i> | <i>Mfg. Co.</i> |
|----------------------------|---------------|---------------|-----------------|
| Permanent Blue-black | 48% | 58.5% | 51.2% |
| " Blue | 12 | 5.5 | 16.2 |
| Washable Blue | 9 | 1.6 | 4.8 |
| Super Chrome Blue | | 1.6 | 1.6 |
| Permanent Black | 12 | 11.0 | 2.4 |
| Washable Black | 3 | 7.0 | 0.9 |
| " Green | 1 | 4.5 | 2.4 |
| " Violet | 1 | 1.6 | |
| " Red | | | 0.9 |
| Ball Point Blue..... | 13 | 8.7 | 17.8 |
| " " Black | 1 | | 0.9 |
| " " Red | | | 0.9 |
| | 100 | 100.0 | 100.0 |

The majority of the letters originated in Massachusetts; both banks had a small number from other New England States, while the manufacturing company's letters originated in 24 states and the District of Columbia. (Submitted by C. A. Schmitt, Ink Examiner of Questioned Documents, Reading, Mass.)

Document Analyst Wanted—The Veterans Administration is seeking the services of a qualified document examiner to fill the position of Docu-

ment Analyst in the Identification and Detection Division. Qualifications for the position are:

- a. Two years experience and training in questioned document work; a college degree is desirable; age up to 35 years.
- b. A thorough knowledge of the principles and techniques of examining and evaluating handwriting characteristics and mechanical impressions; and qualifications to testify in court.
- c. A general knowledge of organic and inorganic chemistry and the applicable principles of physics; also a general knowledge of the chemical and physical properties of inks, papers, and other writing materials and instruments.
- d. Good working knowledge of the operation of scientific instruments and apparatus designed for the fields of microscopy and photography and their special application to the field of document identification; the use of specialized photography by means of infrared, ultraviolet, etc.; a knowledge of the rules of evidence, legal procedure, and the usual court practices in cases involving document identification.

The position carries a professional rating of P-3 at a salary of \$4479.60 per year and involves little travel. Interested persons should write Harold J. E. Gasell, Chief, Identification and Detection Division, Inspection-Investigation Service, Veterans Administration, Washington 25, D.C. for the necessary application form.

Academy of Forensic Science—The organizational meeting of the Academy of Forensic Science (American Medicolegal Congress) has been tentatively set for January 1950 at Chicago. Further information on this organization will appear in this Section as plans become more complete. Professor Ralph F. Turner, Department of Police Administration, Michigan State College, East Lansing, is Secretary of the Academy and will be pleased to add to his mailing list the names of our readers who are interested in being advised of the program.

NEW PRODUCTS

A Compact Listening Device—The Zenith Radio Corporation of Chicago has announced a new and more compact hearing aid, Model 75, which can be adapted to investigative listening. The Zenith 75 hearing aid consists of a high-gain audio amplifier with the batteries and the amplifier contained in one vest pocket sized case. The microphone leads to the grid of the first tube and the negative side of the "A" battery may be disconnected, and leads from the grid and battery may be brought outside the case to a male plug. Various accessories, such as a crystal microphone, a contact microphone, an induction coil (11,400 turns of number 36 enameled wire wound on a powdered iron core, 11/16" dia. by 1½" long), and additional microphone extensions may be connected to the male plug by a companion female receptacle. The complete equipment is compact enough to be carried in a camera carrying case and in use can be worn as a regular hearing aid. The amplifier provides an inconspicuous compact and sensitive listening device which can replace or supplement the bulky equipment customarily employed for this use. (Submitted by Commander M. E. Van Dera, U.S.N.R.)