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Police Science Technical Abstracts and Notes

POLICE SCIENCE TECHNICAL ABSTRACTS AND NOTES

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Imbedding Paint Fragments in Plastic—Imbedding paints in plastic by the method suggested by Brewer and Burd [this Journal, *40*:230-35 (July-August, 1949)] will result in failures when paints are encountered which are somewhat sensitive to the heat necessary to soften the plastic. As an alternative, it has been found that Castolite (manufactured by the Castolite Co., Woodstock, Ill.) will provide a very satisfactory medium for this operation. The particles to be imbedded may be attached to a wire support by clear nail polish, and the entire specimen imbedded in Castolite by either the cold method or the hot method. After the plastic has polymerized a clear, hard support results, and the specimen and mount may be ground and polished as desired. The necessity for slots and clamps is thus eliminated, and the clear background imparts no color to color photomicrographs. (J. D. N.)

2—Anthraquinone Sulfonate Derivatives of Morphine and Codeine—The methods and reagents commonly employed in toxicological analyses fail to show an easy distinction between morphine and codeine. Therefore, M. Feldstein, N. C. Klendshoj, and A. Sprague [*Analytical Chemistry, 21*:1580-1 (1949)], used a solution of 2-anthraquinone sulfonate as a reagent to produce differentiable derivatives. The reagent consists of 1 gm. of sodium 2-anthraquinone sulfonate in 20 ml. of water containing 2 ml. of 3N hydrochloric acid. After filtration the solution may be stored in a brown bottle. One to two mg. of the residue of the ether or chloroform extraction is placed on a slide in a drop of 6N sulfuric acid. The reagent is added from a capillary pipet, and the reaction is allowed to stand for 10 to 15 minutes and then the crystals are washed by decanting. The crystals are characteristic, and the melting points are 198 to 199° C and 175-6° C for morphine and codeine, respectively.

2, 4, 6-Trinitrotoluene—Crystallographic data for TNT is given in the December issue of *Analytical Chemistry* [*21*:1583-4 (1949)]. Crystal system, orthorhombic; forms, brachy pinacoid {010} prism {110} macrodome {061}; axial ratio (a:b:c), 0.375:1:0.153, 0.3793:1:0.1493, 0.376:1:0.151; interfacial angles (polar), $061_{\wedge}0\bar{6}1 = 93°46$, $110_{\wedge}1\bar{1}0 = 138°40$. Principal lines for x-ray diffraction; d = 3.844 ($I/I_1 = 1.00$), d = 5.587 ($I/I_1 = 0.46$), d = 6.990 ($I/I_1 = 0.42$). Molecular refraction (5893A, 25°C) = 1.641. TNT melts at 81° C and readily forms crystals from the melt at lower temperatures.

The Identification of Crepe-Rubber Sole Impressions—The problems attending the identification of a crepe-sole footprint are discussed by H. C. Speller in the October-December issue [*22*:269-275 (1949)] of *The Police Journal*. There are two types of crepe soles, English Re-Milled and Plantation Finished; the English Re-Milled soles have a regular surface, smooth or corrugated; the Plantation Finished soles have many

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accidental individual characteristics. It is possible to render a positive identification where the Plantation Finished sole is involved.

Amyl Acetate: A Solvent for the Separation of Iron in Metallurgical Analysis—The spectrochemical analysis of ferrous metals for trace elements is complicated by the large number of iron lines which interfere. Among the various methods used to rid the sample of iron is the extraction of the ferric chloride with an organic solvent. J. E. Wells and D. P. Hunter [*Analyst, 73*:671-3 (Dec., 1948)] propose the use of amyl acetate as the solvent since it is less inflammable and the concentration of acid is less critical. Separation efficiency with one gram samples is 99.95% when the sample is dissolved in 5 ml. of conc. hydrochloric acid and 2 ml. of conc. sulfuric acid. 20 ml. of amyl acetate are used in each extraction of the above sample. Sulfuric acid cannot be used if sample contains calcium. The extraction of other elements is low with the exception of molybdenum, tin, and vanadium.

Interesting Firearms—The legal definition of a firearm will not apply to the gun described in the December issue of the *Bulletin of the Bureau of Criminal Investigation of New York State Police, 14*:11 (1949). This weapon consists of a piece of steel rod drilled to a depth of two inches with a drill the size of BB shot. At the base of this hole another hole is drilled perpendicular to the long hole. The second hole accommodates a rivet as a plunger. The rest of the gun consists of a wooden handle and a rubberband actuated firing mechanism. To operate, the head of a kitchen match is placed in the bore under the rivet, and a BB shot is introduced. Crushing of the match head under the rivet causes ignition, release of gases, and propulsion of the BB shot with sufficient force to damage soft tissue.

Japanese Pattern 94 (1934) Automatic Pistol—All previous Japanese Pattern 94 (1934) automatic pistols received at the Chicago Police Laboratory and those described in various reference books were of 8 mm. Nambu caliber and rifled with six lands and grooves, *right* twist. Recently, a Japanese Pattern 94 (1934) automatic pistol was examined and found to be chambered for the 9 mm. Luger (Parabellum) cartridge and rifled with six lands and grooves, *left* twist. The barrel appeared to be well made, and a visual comparison between both types failed to disclose any differences. The barrel may have been made by a gunsmith, or it may have been an experimental model made by the manufacturer. The gun functioned in a normal operating manner. (Submitted by Charles J. Panush, Chicago Police Laboratory).

A New Method of Personal Identification Through the Microscopical Examination of Fecal Matter—Vittorio Vanni studied the parasites found in the feces of numerous persons and concluded that no two people harbored the same parasites and therefore that personal identifications were possible by this means. He found that persons from different regions carried parasites peculiar to the region of origin and that the condition remained relatively constant for many years. Techniques for such studies as well as examinations for food residues are described in the article appearing in the *Finger Print Magazine, 31*:3-8 (Oct., 1949).

Exposure and Development of Long Range Subjects—W. F. Lucas suggests a method by which scenes having extreme ranges of values may be photographed to record detail in both highlights and shadows. An overall exposure of three to four times the reading for the darkest shadow is used with twelve minute development in Elon developer (1 oz. of elon, 1 lb. of sulphite, 1 gal. of water). Flash exposure is calculated for one-fourth the distance to the farthest object and then exposing with the next larger size flash bulb and two steps wider diaphragm. Reported in *U. S. Camera, 13:*46-7 (Jan., 1950).

The Restoration of Filed-Out Numbers—A review of the problems of serial number restoration is contained in *The Australian Police Journal, 3:*40-4 (Jan., 1949). A. F. Clarke describes the necessary steps: cleaning, polishing, and etching. Suitable etchants for cast-iron, steel, stainless steel, lead, copper, brass, German silver, aluminum, and zinc are given.

Rogues' Gallery Is No More—The new criminal identification system recently installed in the St. Louis Police Department is described in the April 24, 1949 edition of the *Gravure Pictorial* of the *St. Louis Globe-Democrat.* It eliminates the tedious scanning of many pictures by the victims of crimes by utilizing an I.B.M. sorting machine. The personal identification characteristics of each criminal are noted by the arresting officer on a standard form. This data is then transferred to cards by an I.B.M. key-punch machine; a small picture on micro film is also attached to a space on the card. Thus, a victim may give a description of the criminal, a sort made with an I.B.M. sorting machine and the number of cards or pictures viewed in a special viewer kept to a minimum.

Isolation and Determination of Morphine, Codeine, and Heroin from Viscera and Body Fluids by Absorption. The Separation and Determination of Mixture of Morphine, Heroin, Codeine, and Barbiturates by Adsorption—Two articles by A. Stolman and C. P. Stewart concerning the application of chromatographic absorption analysis to the determination of morphine, codeine, heroin, and barbiturates appear in *The Analyst, 74:*536-42, 543-6 (Oct., 1949). Toxicologists and police analysts are directed to the original articles for a description of the method.

Applications of the Intermittent A. C. Arc Part II. Determination of Rare Earths—The importance of the determination of rare earth elements in evidence is well known to police spectrographers. Those confronted with such problems will welcome J. A. C. McClelland's article in *The Analyst, 74:*529-36 (Oct., 1949) in which he outlines a technique for the spectrochemical analysis of the rare earth elements. The rare earths are concentrated chemically, iron oxide is added as internal standard, and the specimen is fused with potassium hydrogen sulfate ($KHSO_4$: $Fe_2O_3 = 4:1$) on the electrode. The exposure is made using the intermittent A. C. arc. Line pairs and sensitivity are given.

Spectrophotometric Evaluation of the Color of Ink Marks on Paper—The precise description of ink specimens has been rendered more nearly possible as a result of work by C. F. Bailey and Robert S. Casey [*Analytical Chemistry, 19*:1020-2 (Dec., 1947)]. Although this article does not deal with the problems from the viewpoint of document examination, it may serve as a guide for further study. Bailey and Casey evaluate ink marks by the spectrophotometric method according to trichromatic coefficients, dominant wave length, luminance, and purity. [For description of the method and terms, see Spectrophotometry for Chemists, by R. S. Casey, *Journal of Chemical Education, 24*:446-9 (Sept., 1947)]. Observations were also made on the changes of these values over a period of two weeks.

Penetration from Bursting, Unconfined Cartridges—The occasional misunderstanding concerning the results of heating loaded cartridges to the point of ignition lead the authors to conduct the following tests. Twenty-two caliber long rifle, .38 S & W, and .45 caliber auto cartridges were placed individually, base down, on a cold hot plate. The entire hot plate was surrounded by nested corrugated boxes, and the hot plate was heated until the cartridges exploded. The resulting penetrations of the boxes were noted and only in the .45 caliber test did the projectile penetrate the box material; then only two layers were pierced. The fragments of the burst cases of the .45 caliber cartridges succeeded in penetrating three layers of boxes. The tests were repeated with cartridges lying in a V-block, and the results were the same as those with the cartridge vertical. Thus, it may be presumed that the penetration of a projectile from a cartridge thrown into a fire or dropped is highly improbable, and the major hazard is from the flying fragments of the burst case. These tests were valuable in unravelling the stories told by juveniles allegedly wounded by flying or burst cartridges. (Submitted by John G. Sojat and Charles J. Panush, Chicago Police Laboratory.)

A New Test for Seminal Stains—By utilizing the test of Seligman and Manheimer [*Journal of the National Cancer Institute, 9*:427-34 (1949)] for phosphatase activity, J. T. Walker has developed a rapid test for seminal stains. The area to be tested is treated in a bath at pH 5 containing α-naphthyl phosphate as a substrate and anthraquinone-1-diazonium chloride. The reagent consists of 23 gms of sodium chloride, 0.5 cc of glacial acetic acid, 2 gms of sodium acetate trihydrate in 90 cc of water. A suspension of 30 mg. of anthraquinone-1-diazonium chloride and 50 mg. of calcium-1-naphthyl phosphate in 1 cc of 1% aerosol is added. α-Naphthol, liberated by the acid phosphatase, combines with the diazonium salt to form an orange-red pigment. The reaction takes 30 seconds on fresh stains; blood lengthens the time but does not interfere. Moistened filter paper may be used to pick up the acid phosphatase from skin or from fabric; the test is then conducted on the paper. This technique does not interfere with later examinations for spermatozoa. The methods for preparation of the reagents may be found in the original article by Seligman and Manheimer. J. T. Walker's note appears in the *New England Journal of Medicine, 242*:110-11 (Jan. 19, 1950).

Color Standard for Drunkometer—The end point standard for the

Harger Drunkometer may be prepared in the following two ways. The first preparation is organic and has limited keeping qualities although many who have used it have been satisfied with the results obtained. It consists of a mixture of two solutions; 6 cc. of a 0.1% solution of Du Pont Tartrazine and 4 cc. of a 0.1% solution of Du Pont Crocein Scarlet N Extra in a quart of distilled water. The second standard is inorganic and possesses fine keeping qualities. It is prepared by combining 27 cc. of 5% cobalt sulfate solution (0.6 cc. of drunkometer acid per 100 cc.) with 1 cc. of 1% potassium dichromate and 89 cc. of distilled water. The stock solutions of both standards keep quite well, and only the standards need to be changed. (Submitted by R. N. Harger, Indiana University Medical Center.)

Explosion of Refrigerated Flammable Liquids—The explosive hazard of storage of flammable liquids in ordinary household refrigerators is pointed out by H. H. Fawcett in the *Chemical and Engineering News, 27*:2102-3 (July 18, 1949). The arc produced by the thermo-regulator is sufficient to ignite the air-vapor mixture present when preparations are placed in the refrigerator for crystallization. It is suggested that modification be made where a refrigerator is used for this purpose.

The Explosibility of Starch Dust—The recent wave of severe starch dust explosions initiated some experiments at the United States Bureau of Mines Laboratory, the results of which are noted in the *Chemical and Engineering News, 27*:2071-2 (July 18, 1949). I. Hartmann and J. Nagy report that there is still a general unawareness on the part of manufacturers concerning the conditions under which starch explosions might occur. Neither high humidity nor high natural moisture content is a reliable preventive.

Preparation of Effective Lantern Slides—The proper presentation of training material in police schools is assisted by visual-aid material; however, improperly prepared slides detract rather than aid in the development of the subject. The formulas and suggestions outlined by L. S. Bonnell in the *Chemical and Engineering News, 27*:2600-6 (Sept. 12, 1949) are worthwhile guides for those confronted with this problem.

Second Annual Review of Analytical Chemistry—*The Analytical Chemistry, 22*:2-136 (Jan., 1950) again presents a fine review of analytical chemistry covering the developments of 1949 in 27 papers.

Questioned Document Examination—A general article on various aspects of this science appears in the *Bulletin of the Bureau of Criminal Investigation, New York State Police, V. 14* (1949). Eight photographic illustrations appear in this article. (D. J. Purtell.)

Writing Inks—Ball-Point Pens and Inks—Two articles with regard to writing fluids and instruments should be of interest to document examiners. The articles are on general subjects and not on the chemistry of examination of inks. In the *Chemical Industries* (Feb., 1946), R. S.

Casey's article entitled, "Writing Inks," takes up the technologic and economic aspects of the manufacture of writing inks. In the July, 1948 issue of the *Chemical Industries* appears an article by C. H. Lindsey, R. B. Schmidt, and R. S. Casey entitled, "Ball-Point Pens and Inks." A brief history and the problems in the manufacturing of these types of pens are included with the characteristics of ball point pen writings and inks. Both of these articles have a fine list of references. (Submitted by D. J. Purtell, Chicago Police Laboratory.)

Identification of the Make of Typewriter—With an adequate reference collection of typewriting specimens United States experts can accurately identify the make of machine from a careful study of its work, but current trade conditions in Europe greatly complicate the problem. Jean Gayet [*International Criminal Police Review:* (26)10-16; (27)11-20; and (28)16-26 (March-May, 1949)] points out the sources of errors as: War damaged machines rebuilt with salvaged parts, manufacturers who buy their type from any available source, and the vast numbers of makes and models which may be encountered in the European police laboratory. Therefore, identification based upon the design of type alone is in his opinion not reliable. He then sets about to investigate other factors which may be of value. Position of the upper and lower case letters on the typebar and "motion" as shown in an impression which due to improper shifting prints fragments of each letter; spacing of characters along the line of writing and the interval between successive lines of writing; and the position and width of feed rollers when shown in a carbon copy can all be of assistance. In conjunction with a description of methods of manufacture and repair a great number of other factors are considered but deemed to be of no use as identifying features. A proposed method of identification by photographic superimposition of unknown and reference specimens is discussed, but some serious shortcomings of the method are not recognized. While the article discusses the problem of make identification purely from an European point of view, it attempts to investigate all aspects of the question and should be of interest to document examiners generally. (Ordway Hilton)

Academy of Forensic Sciences—The organizational meeting of the Academy of Forensic Sciences was held January 26-28, 1950, in Lincoln Hall, Northwestern University School of Law in Chicago. A series of worthwhile professional papers were read. At the business meeting on January 26, a constitution was presented and adopted by those present. The following officers were then elected: Dr. R. B. H. Gradwohl, President; 3514 Lucas Avenue, St. Louis, Missouri. Dr. Samuel Levinson, Vice-President; University of Illinois College of Medicine, 808 South Wood Street, Chicago, Illinois. Professor Ralph F. Turner, Secretary-Treasurer; Department of Police Administration, Michigan State College, East Lansing, Michigan. Dr. Milton Helpern, Executive Board, Deputy Chief Medical Examiner, Office of the Medical Examiner, New York, N. Y. and Dr. Louis Regan, Executive Board, 1925 Wilshire Boulevard, Los Angeles, California. At the close of the session Dr. Gradwohl called a meeting of all officers, and plans were laid for the continuation of the work of the Academy. Prospective members are invited to communicate with the above officers.

Interested parties will be advised of future developments by mail and announcements in this Journal.

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 an endorsement by the Journal.

Phase-Contrast Microscope—Pfaltz and Bauer are distributing a microscope produced by Officine Galileo at Milan, Italy. The instrument is adaptable to a bright field, phase-contrast or dark field microscopy by means of a pancratic substage condenser. An auxiliary lens in the microscope tube eliminates the focusing magnifying eyepiece otherwise needed for adjusting the phase optics.

Print Loc—Documents, photographs, fingerprints may be preserved by applying a thin, transparent coating of plastic contained in Print Loc. As a substitute for shellac in the preparation of footprints for casting, Print Loc has meritorious features. Perhaps the most appealing aspect of Print Loc is the readiness with which it may be applied. The plastic is in solution in a container under pressure; manipulating the release button produces a fine spray of the plastic which dries rapidly and leaves a smooth, transparent coating protecting the evidence.

Foreign Language Periodicals and Articles of Interest in the Field of Police Science *

Compiled by
Kurt Schwerin†

Archivio di antropologia criminale psichiatria e medicina legale. Milan. Ser. V, vol. 69, April/June, 1949, fasc. 11.

A. Fornari, *Considerazioni attorno a 33 casi mortali di intossicazione ossicarbonica non provocata da gas illuminante* (Observations on 33 mortal cases due to carbon monoxide poisoning not caused through lighted gas) (p. 113-124). A. Baldi, *Su di un nuovo metodo per la determinazione de CO nel sangue* (A new method of determining carbon monoxide in the blood) (p. 125-126).

Kriminalistik. Zeitschrift für die gesamte kriminalistische wissenschaft und praxis. Heidelberg. 3d year, no. 23/24, Dec. 1949.

Dr. Schwarzer, *Was braucht die deutsche kriminalpolizei?* (What is the German criminal police in need of?) (p. 266-269).

* All periodicals listed are available in the Elbert H. Gary Library, Northwestern University School of Law, 357 East Chicago Ave., Chicago.

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Kriminalistika. Review of criminology and criminal practice. Prague. 4th year, no. 8/9-10, August/Sept.-Oct. 1949.

Julius Sem, Detektor Lzi (The lie detector) (no. 8/9, p. 110-115). Josef Rajchl, *Blesk jako pricina pozáru* (Lightning as cause of fire) (no. 8/9, p. 120-122). N. V. Terziev, *Vyznam fysiky v kriminalistice.* The importance of physics in criminology. Soviet methods of utilizing X-rays, electromagnetism, and spectroanalyse) (no. 10, p. 142-144). The articles in Kriminalistika have summaries in English, French, and Russian.

Die neue polizei. Monatliche fach- und lehrschrift der polizeiorgane. Munich. 3d year, no. 10-12, Oct. 15-Dec. 15, 1949.

H. Merkel, *Ueber todeszeitbestimmungen menschlicher leichen auf grund gerichtlich-medizinischer erfahrungen.* Pt. 2. (On determining the time of death on the basis of medico-legal experience) (no. 10, p. 197-199). J. W. Kallenborn, *Die affaire van Meegeren. Die gerichtliche untersuchung* (The case of van Meegeren. The criminal investigation) (no. 11, p. 216-221). W. Froentjes, *Die affaire van Meegeren. Die wissenschaftliche untersuchung* (The case of van Meegeren. The scientific investigation) (no. 12, p. 236-241) [Reprinted from Revue internationale de police criminelle]

Nordisk kriminalteknisk tidsskrift. Stockholm. 19th year, no. 7-10, 1949.

Harry Söderman, *Inbrottsförebyggande åtgärder.* (The prevention of burglaries) (no. 8, p. 85-86). P. Christiansen, *Inbrudsmetoder i Danmark* (Methods of burglary in Denmark) (no. 8, p. 86-89). This article and two articles on burglary methods in Finland, by E. Otila (p. 90-92) and burglary statistics in Sweden, by H. Sahlén (p. 92-93) have summaries in English. Reidar Sveen, *Støveksplosjoner* (Dust explosions) (no. 10, p. 112-115).

Revista de la Escuela de estudios penitenciarios. Madrid. 5th year, no. 55-56, Oct.-Nov. 1949.

Juan Lorca Cánovas, *La dactoloscopia en Inglaterra y su sistema de identificaçion dactilar* (Dactiloscopy in England and the English system of fingerprint identification) (no. 56, p. 50-57).

Revue de criminologie et de police technique. Geneva. Vol. 3, no. 4, Oct./Dec. 1949.

J.-Y. Dautricourt, *Le problème de la police universelle* (The problem of the universal police) (p. 235-241). T. Fornaggio, *Contribution a l'identification des armes a feu par l'examen des douilles* (A contribution to the identification of firearms through the examination of cartridges) (p. 276-291). Bob Mengering, *Un appareil transportable pour les recherches aux rayons ultra-violets filtrés* (A portable instrument for research on ultraviolet rays) (p. 291-292).