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## Police Science Technical Abstracts and Notes

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## POLICE SCIENCE TECHNICAL ABSTRACTS AND NOTES

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**Typewriting Identification: Ransmayer & Rodrian Style "Ro. 7"**—J. Haas, *Archiv fuer Kriminologie*, 125 (1/2): 2-14 (January-February 1960). The type manufactured by Ransmayer & Rodrian, Europe's largest producer of typewriter type, is used on a great number of machines, including some American makes. This poses a special problem in determining make, model, and age from a piece of questioned typewriting, particularly as one style, Elite "Ro 7", has been used on many different machines without major design changes since 1929. However, the changes which have been made since that time are identified in the article, and a scheme is devised to facilitate differentiation which is partly based on variation in letter spacing (pitch) used by typewriter manufacturers. An interesting note is the Ransmayer company's reported willingness to cooperate with law enforcement agencies to the extent of incorporating minute changes in the type design in order to facilitate the dating of typescript. In 1958, the design of the letter "f" was changed expressly for this purpose. (JB)

**History of the Comparison Microscope**—A. Bessemans and H. Baert, *Archiv fuer Kriminologie*, 125 (1/2): 29-35 (January-February 1960). The development of the comparison microscope and its applications are traced with emphasis on the work done by pioneer criminalists in Europe. Goddard is credited with the first use, in 1923, of this instrument in "scientific criminalistics". (JB)

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**Developing Latent Fingerprints with Iodine Fumes**—J. Mathyer, *Archiv fuer Kriminologie*, 124 (5/6): 153-155 (November-December 1959). The author recommends as still very useful two methods which have been employed at his laboratory for decades. (1) soaking the paper bearing the iodine-developed fingerprints in a very dilute solution of palladium chloride in water (1:1,000) in order to intensify the color and to increase the contrast to the background. The reaction takes one or two minutes in a photographic tray, and the document should be thoroughly washed and air dried; (2) A few iodine crystals are placed in a heated porcelain dish and a piece of plate glass placed over it. The sublimated iodine forms a coating on the glass which can then be stored while protected by another piece of glass. For latent fingerprint development the coated glass is placed on top of the questioned paper and heated by the palm of the hand. (JB)

**Crime Scene Equipment: Vehicles**—N. Fahlander, *Nordisk Kriminalteknisk Tidskrift*, 29 (12): 313-324 (December 1959). Vehicles designed to transport a wide variety of crime scene equipment in use by the Swedish State Police are described. Experience in that country showed that a panel delivery type of car, or a Volkswagen bus, met the requirements of compactness and road speed with maneuverability. (JB)

**Underwater Search for Evidence**—N. Fahlander, *Nordisk Kriminalteknisk Tidskrift*, 30 (1): 1-13 (January 1960). A detailed survey of dragging equipment and its use in searching for bodies and other evidence. Several different types are described. (JB)

**Microspectrophotometry**—H. Amsler, *Archiv fuer Kriminologie*, 124 (3/4): 85-94 (September-

October 1959). The microspectrophotometer devised by the Zurich Police Laboratory is used primarily for the color differentiation of textile fibers. An objective color comparison is achieved by means of a simplified spectrophotometer composed of a monochromatic light source (grating type), voltage regulator, a microscope, a photomultiplier tube, and a photovolt-meter. No details of the construction or circuits of the apparatus are provided, but the reader is referred to an article describing a similar instrument which appeared in *Zeitschrift fuer Wissenschaftliche Mikroskopie und Mikroskopische Technik*, 63:453-476 (1958). (JB)

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**New Medical Film—"A Matter of Fact"**—It is reported in *Modern Drugs*, The Journal of *The Modern Drug Encyclopedia*, March 1960: 1412, that prints of a new medical film are available for loan from the Wm. S. Merrell Company, Cincinnati 15, Ohio, and the American Medical Association. The film is with sound and runs for 30 minutes. The film portrays the serious implications of an innocent man being accused of murder due to an inadequate post-mortem examination conducted by a county official who lacks the requisite technical training. (RMC)

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**Analysis of Explosives Using Infrared Spectroscopy**—Frank Peistera, Michael Halik, Alexander Castelli, and Walter Fredericks. *Anal. Chem.* 32 (4): 495 (April 1960). The authors list infrared spectrograms covering 68 common high explosives, many possible ingredients, additives and related compounds. A discussion of the methods used and the use of the charts is included as well as tables of other physical characteristics of the compounds investigated. (JFW)

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**Design and Use of a Refined Microelectrophoresis Unit**—Benjamin W. Grunbaum and Paul L. Kirk. *Anal. Chem.* 32 (4): 564 (April 1960). The instrument described provides for multiple runs (up to eight simultaneous samples) and for samples of from 0.01 to 0.1 ul. It has possibilities in the fields of biology, clinical medicine and criminalistics. Illustrations include charts of inks and biological fluids. (JFW)

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**Infrared Spectroscopy of Surface Coatings in Reflected Light**—Hans Dannenberg, J. W. Forbes

and A. C. Jones. *Anal. Chem.* 32 (3): 365 (March 1960). The authors describe a reflection method of examining organic coatings on metal surfaces. Quantitative as well as qualitative examinations are possible if the effects of multiple reflections are taken into account. The change of the curves with time and methods of curing would be of interest to the criminalist. (JFW)

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**Forensic Pathology Seminar**—Conducted by Arnold F. Strauss and Geoffrey T. Mann, *Journal of Forensic Sciences*, 5(2): 169-216 (April, 1960). A seminar discussion of case history, microscopy, medico-legal problems, and other phases of six unusually different cases:

1. Accidental strangulation during perverse sexual activity.
2. Ethylene glycol poisoning.
3. Electric current mark.
4. Medico-legal examination of partial human remains.
5. Prenatal pneumonia.
6. Adenoacanthoma of ovary. (WEK)

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**Toxicology of Glutethimide**—Alvera J. Algeri and George G. Katsas, *Journal of Forensic Sciences*, 5(2): 217-25 (April, 1960). A method for the determination of glutethimide in liver is described. The results of quantitative analysis of liver and blood available after autopsy of four fatalities due to intoxication by glutethimide are presented.

Concentrations of glutethimide in whole blood of a human subject following oral ingestion of a therapeutic dose of the drug were determined in samples taken at intervals over a 48-hour period. The physiological effects are also described. On the basis of accumulated knowledge, the diagnosis of glutethimide in clinical or fatal cases should no longer present difficulties. (WEK)

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**The Spectrographic Examination of Small Samples by a Procedure Giving High Sensitivity**—W. Allan Cregeen, *Journal of Forensic Sciences*, 5(2): 226-35 (April, 1960). A cathode layer excitation method has been described, applicable to the examination of paints and related material in forensic science where duplicate spectrographic samples are limited to 2 mg. each. A special carbon cathode serves as the sample electrode, and the method depends upon projection of the image of the cathode in the close vicinity of which there exists an enriched zone of ions and atoms due to

cathodic migration. Data has been presented comparing results from this method with those obtained from a normal excitation method. A tenfold increase in absolute sensitivity was indicated. (WEK)

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**The Identification of Petroleum Products in Forensic Science by Gas Chromatography**—D. M. Lucas, *Journal of Forensic Sciences*, 5(2): 236-47 (April, 1960). The identification and/or comparison of petroleum products is a problem which occasionally confronts the forensic scientist during the examination of evidence from cases of suspected arson, sabotage, malicious damage, or mischief. Proper identification of these materials is complicated by the fact that they are not specific chemical identities, such as the toxicologist usually deals with, but complex mixtures of hundreds of different hydrocarbons. In some aspects of forensic science such as ballistics, a great number of features available for comparison is an advantage. This is not the case with petroleum products, however, since the components cannot be isolated and examined individually.

Gas chromatography appears to have great potential in the identification of a type of petroleum product and in the differentiating of different brands of a type. Only part of this potential has been revealed by this work. More research must be done on various brands of petroleum products other than gasoline. These preliminary studies indicate that if two samples of gasoline appear the same in both peak position and intensity they probably have come from the same refinery and within a short space of time. If they are different in any respect it does not necessarily follow that they came from different refineries. It would also appear that it is impossible for the forensic scientist to determine what particular refinery a given sample has come from. (WEK)

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**A Critique of the Methods for the Extraction of Some Barbituric Acid Derivatives from Biological Materials and Their Identification**—Gwendolyn B. Carson and Clayton S. Smith, *Journal of Forensic Sciences*, 5(2): 248-58 (April, 1960). While there is no federal law similar to the Harrison Act for the regulation of the dispensing of barbiturates, they may not be sold over the counter because of state or local regulations. Prescription items are apt to move more slowly than over the counter items and

for this reason may remain in stock longer. Since there has been some discussion concerning the stability of barbiturates (particularly to air and atmospheric moisture in the presence of light), a decision to investigate this point was made.

1. The melting points of barbituric acid preparations exposed to room temperature for a period of 60 days were not materially altered or changed.

2. Barbituric acid derivatives are more readily extracted from tissue when an aqueous solution of pH 10 is used.

3. The determination of the refractive index is a valuable adjunct especially when the material available is not sufficient to prepare organic derivatives. (WEK)

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**Nondestructive Infrared and X-ray Diffraction Analyses of Paints and Plastics**—William R. Heilman, *Journal of Forensic Sciences*, V. 5 (3), July 1960. The infrared spectrophotometer is an indispensable instrument for use in paint examinations and comparisons. The identification of plastics, which are now so extensively used for both functional and decorative purposes, also demands infrared absorption analyses.

Infrared absorption analyses, especially suited for small samples, are relatively simple and rapid and are, above all, positive in the case of lucite finishes. The nondestructive nature of this type of analysis also follows for subsequent pigment, dye, and extender examinations and for final spectrographic comparisons.

Like the infrared instrument, the X-ray diffraction spectrometer analyzes with a nondestructive method and will present pertinent information on small samples. In the analyses of paints and plastics, the X-ray diffraction spectrometer is a valuable adjunct to the infrared spectrophotometer. Several methods of sample preparation are enumerated as well as a few case examples. (WEK)

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**Firearms Identification Problems Pertaining to Supplemental Chambers, Auxiliary Cartridges, Insert Barrels and Conversion Units**—Burton D. Munhall, *Journal of Forensic Sciences* 5 (3), July 1960. In the course of an investigation, the firearms technician is frequently asked his opinion as to what type of gun might have been used to fire a particular bullet or cartridge case. Generally we can expect a .22 rim fire cartridge to have been fired from a .22 rim fire gun or a 12 gauge shell

from a 12 gauge shotgun, but there are troublesome exceptions in all classes of firearms. The purpose of this paper is to call a few of these to the technicians attention.

The exceptions discussed are:

1. Springfield .22 Conversion Unit
2. Stoeger .22 Caliber Attachment
3. Elterich Rifle Bullet Shell
4. Winchester Supplemental Chambers
5. Tubes Tromblon
6. Mayer's Duck Raiser
7. Armax Auxiliary Barrel
8. Marble Auxiliary Cartridges
9. Zip Chambers
10. Tri-Jen Auxiliary Cartridges
11. Colt .45/.22 Conversion Unit
12. 4mm Uebungsmunitions

The author concludes: "It would be wasting time and space to point out to any firearms technician how devices such as have been described could complicate an investigation. A word of caution will suffice. Do not jump to any hasty conclusions." (WEK)

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**A Career in Law Enforcement—Directory of Colleges, Universities and Schools—*Law and Order* 8 (7), July 1960.** The editorial staff of *Law and Order* has compiled a list of colleges, universities, and schools having some degree of specialized training in the field of law enforcement. There are probably others in addition to this listing of 49, especially in view of the fact that 105 questionnaires were originally sent out in order to gather the information.

This is a good source of reference material that will enable all police agencies to maintain excellent public relations especially when inquiries of such nature are received. (WEK)

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**The Chloride Test as a Technique in the Investigation of Suspected Drownings—Carl R. Kempe, *Police*, July–August 1960.** A discussion of Gettler's test to indicate drowning. If the chloride content is greater in the right side of the heart (blood going to the lungs) than it is in the left side of the heart (blood coming from the lungs), it can be assumed that drowning has occurred in fresh water. On the other hand, if the chloride content is higher on the left side of the heart than it is on the right, the evidence is strong that drowning occurred in salt water.

These principles have been well known for a

number of years and the practice of chloride determination is carried out in some areas having large medical examiner departments. The purpose of this paper is to demonstrate that this relatively simple scientific technique is of great importance in elucidating the cause of death in cases encountered in the medical examiner service of a city of moderate size.

The prosecutor or his staff may require performance of these tests whenever necessary to prevent the failure of justice. As a preliminary investigative procedure, the results of the chloride determination may cause a complete medico-legal autopsy to be performed. The apparent correlation of these chloride tests to cases of suspected drownings shows the evidentiary value which may be gained. These suspected drowning cases can and do tell a story. The evidence only needs uncovering.

The author omits a detailed explanation of the chemical method of analysis but does include the reference to Gettler's original work. Also, there is no mention of the scientific controversy relative to this method. Some researchers have claimed that Gettler's sodium chloride method is not as reliable as others reported in the literature. (WEK)

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**Traveling Microscope—Frank H. Heck, Jr., *Photo Methods for Industry*, 3, (7), July 1960.** Anyone who works with photomicrographs knows how hard it is to take a series of photomicrographs of a single flat subject and have complete control over exposure and focus. Essentially, the finished machine is a continuously-scanning viewing mechanism and low power photomicrographic camera. The major advantage of the instrument is that it can scan and photograph a continuous section of any flat surface while assuring uniform lighting. The lights and the microscope lens remain in the same position relative to each other while the subject is being photographed. Although hardly portable, the machine is movable on large-diameter rollers.

In making a photograph, the specimen is mounted on the stage of the instrument. It remains stationary. The camera is driven across the subject with a worm-drive. In microcosm, this simulates the flight of an aerial reconnaissance plane over terrain. The film (70 mm rolls) is tracked along the focal plane in synchronization with the camera. There is no shutter; instead, a

slit "wipes" the image on the film. Even during exposure, the image may be viewed optically because a split mirror reflects part of the image to a viewing screen.

A simplified drive control is provided for shooting at different speeds and magnifications. To insure vibrationless operation, an efficient motor drive is used in conjunction with timing belts.

The primary reason for the building of the traveling microscope is its use as a quality control instrument in glass manufacture. But as such a fascinating and useful device, it has found other applications including metallurgical studies of metal surfaces, and studies of the flow and drying properties of paints, lacquers, and varnishes. In one study, the unit was used to study the ribbing of vinyl materials. This helped select the type of vinyl best for a particular kind of glass lamination. As one of Heck's colleagues puts it, "As a viewing device it has been a godsend, while as a means for continuous photomicrographs it is unequalled". (WEK)

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**Identification of Human Blood on the Basis of Proteolytic Enzyme System and its Application—**Ervin Szollosy and Bela Rengei, *Journal of Forensic Sciences*, 5 (3), July 1960. A frequently occurring problem in forensic medicine is to decide whether a blood stain is of human or animal origin. A method to identify human blood is described on the basis of the fibrinolytic system of human blood. The object containing blood stain is extracted with buffer mixed with a given amount of streptokinase and dropped on the surface of a fibrinoplate. In the case of human blood a marked lytic area develops. (WEK)

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**Forensic Pathology Seminar—**Conducted by Arnold F. Strauss and Geoffrey T. Mann, *Journal of Forensic Sciences*, 5 (3), July 1960. This is a continuation of the Seminar which first appeared in the April 1960 issue. Three new cases are discussed:

7. Problems in estimating post-mortem interval.
8. Carcinosarcoma in burn scar.
9. Arsenical keratosis with beginning arsenical carcinoma. (WEK)

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**Application of the Gas Chromatograph in the Laboratory of Criminalistics—**W. J. Cadman and Theron Johns, *Journal of Forensic Sciences*, 5 (3), July 1960. Several possible applications of the gas chromatograph in the laboratory of eriminalistics

are discussed. The ability of the instrument to separate highly complex samples can be used to great advantage. The rapid quantitative and qualitative analysis of ethanol and other volatiles from blood represents one of the major applications for this type of instrumentation. A wide variety of other toxic substances such as hydrogen sulfide, cyclopropane, carbon monoxide, carbon disulfide, and ethchlorovynol are also analyzed with this method.

It has been shown to have real value in certain types of arson and theft cases. When combined with infrared by using collected fractions, identifications which would not otherwise be practical can be made. (WEK)

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**Identification of Amino Compounds in Toxicology—**R. C. Gupta, *Journal of Forensic Sciences*, 5 (3), July 1960. In view of the growing number of marketed drugs, it is becoming increasingly difficult for a toxicologist to identify an unknown organic compound involved in a toxicological case. A micro method has been developed to detect primary aromatic amines by color reaction on p-dimethylaminobenzaldehyde paper. Compounds other than primary aromatic amines do not give positive tests under the described conditions. (WEK)

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**Identification of Bodies by the V Test—**(from an article by A. Ravina in *Presse Medicale*, 68: 178, 1960) Appeared in "What's New", Abbott Laboratories, No. 218, 1960. Ravina published an essay on the identification of the victims of the steamship "Noronic", in which he showed that x-rays of the skeleton could be a valuable aid to identification. Voluter had also studied human bones by radiology, especially of the skull, and after reading Ravina's article, published a work on the identification of bodies by means of x-rays of the sella turcica. This has been published in 1959 by S. Karger.

Voluter has noted that the region of the sella turcica is protected on one side by strong bones and on the other by the elastic mass of the cerebrum. It is one of the regions of the body which resists best and longest any destructive influence. He also points out that the form and volume, angle and other characteristics form a variety of combinations that is as great as the various combinations of fingerprints. He also points out that it is easy to identify the sella turcica in most

cases, provided one has a radiograph of the base of the skull taken before the accident. By comparing this with an x-ray taken of the cadaver, identification is easy.

X-rays of the sella turcica are easy to take and moderate in price, and require no special apparatus. It is suggested that x-rays of the sella turcica region should be taken on soldiers, sailors, as well as any other people engaged in dangerous operations such as miners, test pilots, and submarine divers. The same procedure could be used in criminology and might expedite the solution of certain lawsuits, especially in insurance matters. Under the name of V Test, Voluter has also used the same procedure in cases of mixed identity in newborn babies. (WEK)

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**Shotgun Wounds**—Paul F. Guerin, *Journal of Forensic Sciences*, 5 (3), July 1960. 167 deaths due to shotgun wounds for the four year period, 1952 to 1955, in Maryland are reviewed. The characteristics of shotguns, shotgun ammunition, and shotgun wounds are reviewed showing illustrative cases, and the method of determining range of fire for shotgun wounds is discussed. Most of the shotgun wounds were either classified as homicides or suicides, with the vast preponderance occurring in males. A careful study of these wounds will frequently enable one to determine the range of fire, the make and type of ammunition used, and the manner and cause of death. (WEK)

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**A Polarized Binocular Microscope**—In the identification of materials by means of chemical microscopy—and particularly with respect to crystalline products obtained in micro-tests for drugs and narcotics—the application of polarized light techniques is often of considerable value. For such work the standard polarizing microscope is essential to the measurement of the optical properties of the substance. Alternately, an ordinary monocular microscope may be fitted with polarizer and cap analyzer to provide a limited substitute for the specialized instrument.

Where the worker is accustomed to utilize a binocular instrument, however, and has need from time to time to merely view his crystalline reaction product under polarized light, the monocu-

lar fitted with cap analyzer, or even the polarizing microscope, may prove unsatisfactory, and cap analyzers fitted to the binocular instrument are inconvenient.

While the application of polaroid accessories to an ordinary microscope is not new, persons desiring to equip their binocular instruments for such use may be interested in an adaptation which proves most satisfactory for general use. For the polarizer, a disc of polaroid is inserted below the substage condenser, in the usual manner. The analyzer, however, is a small disc of polaroid set immediately behind the front lens of a 16 mm. or 4 mm. objective of a revolving nosepiece. For all ordinary work, a duplicate lens (but not fitted with polaroid) is utilized. To examine an object in polarized light it is only necessary to slip in the polarizer, and rotate the nosepiece around to the objective which has been fitted with polaroid. By such means one may quickly change from standard illumination to polarized light without change in magnification, while enjoying the advantages of a binocular instrument.

Another addition to the instrument further enhances its use for routine work. This accessory is merely a glass slide, or disc, on which a layer or two of Scotch tape has been affixed. Placed between the polarizer and the substage condenser, this simple unit will provide (by rotation) color contrast between crystals and background suitable for both visual examination and color photography. Not all transparent tapes will work, and there is considerable variation between any given brand of tape, but by trial and error, transparent films, tapes, or plastics will be found to provide almost any desired color effect.

Use of this adaptation facilitates locating crystals where they might otherwise be obscured by oil-globules or other reaction products. It is also of considerable assistance in the interpretation of the shape and form of many crystals. Though not suited to measuring problems, the instrument so equipped will be found far more versatile than usual. Samples of polaroid may be obtained from the Polaroid Corporation, Cambridge, Massachusetts. (John E. Davis, Criminalist, Oakland Police Department, Oakland, California)