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Police Science Technical Abstracts and Notes

POLICE SCIENCE TECHNICAL ABSTRACTS AND NOTES

Edited by
Joseph D. Nicol*
Abstractors
William E. Kirwan†

Ion Separation on a Thread—J. Mahon and A. A. Benedetti-Pichler, *Mikrochimica Acta*, 1960 (6): 831–35. Cotton thread is used as a chromatographic media in separating mixtures of metallic ions. Small quantity of solution is required, and several group separations may be accomplished by solvent extraction. (JDN)

Identification of Textile Coatings by Infrared Spectroscopy—F. H. Forziati, R. T. Hite, and M. K. Wharton, *American Dyestuff Reporter*, *49*(4): 29–33 (February 22, 1960). A solvent extraction scheme separates coatings into fractions which are then analyzed by KBr pellet technique. Small specimens are required, and the results are more specific than for chemical methods. (JDN)

Identification of Unknown Synthetic Fibers, Part IV, Revision, New Fibers, Cross Sections—S. G. Smith. *American Dyestuff Reporter*, *49*(21): 27–35 (October 17, 1960). The scheme for fiber identification is brought up to date with the inclusion of new synthetic fibers. The identifications are based on optical and chemical properties and cross sectional shapes. (JDN)

A Scheme for Fiber Identification with Emphasis on New Polyacrylic, Polyamide, Polyester, and Celulosic Fibers—R. S. Merkel, *American Dyestuff Reporter*, *49*(18): 13–25 (September 5, 1960). A qualitative scheme based on solubility and reaction to color stains. Some cross sections are shown. (JDN)

Dirty Kerosene Lantern Causes Accident (Explosion)—E. R. Palm, *Kriminalistik*, *14*(1): 26 (January, 1960). Dirt covering the air screen at the base of a lantern caused an incomplete combustion of the fuel so that an explosive mixture was generated. This mixture detonated when the lamp was relit. (JDN)

Strangling: Murder or Suicide—Keith Simpson, *International Criminal Police Review*, No. 138: 137–41 (May, 1960). A study of six cases of self-strangulation by ligature indicates the possibility of this manner of suicide. Since it is possible for self-strangulation to resemble homicidal strangling, it is necessary for the investigator to procede with caution, and the author concludes that homicide should be suspected until proved otherwise. (JDN)

Developing Latent Prints on Absorbent Surfaces—A. R. McLaughlin, *Fingerprint and Identification Magazine*, *42*(8): 3–16 (February, 1961). A survey of the methods by which fingerprints can be developed on absorbing surfaces. The methods are evaluated and suggestions are given for maximum efficient use. (JDN)

The Determination of Methanol in Biological Fluids—C. D. Hough, *The Analyst*, *85*(1017): 921–2 (December, 1960). Three milliliters of diluted H_2SO_4 (1:2) and 1 ml of potassium permanganate sol. (0.3%, w/v) is placed in each of three Cavett flasks. 0.1 ml of saturated potassium carbonate solution is placed in the cup of the stopper. In the cup of flask 1, place 0.5 ml of blood or urine. In the cups of flasks 2 and 3, place 0.1 and 0.5 ml of standard methanol solution (1.0%, w/v). Incubate at 37°C for 4 hours, remove stoppers, add sodium sulfite solution (saturated) until permanganate is decolorized. Add 4 ml of concentrated sulfuric acid and 0.1 ml of chromotropic acid. Mix, suspend flask in boiling water bath for ten minutes. Transfer to 10 ml volumetric flasks, wash Cavett and add washings to volumetric flask. Make up to 10 ml after cooling. Read at 570 mμ against blank. Ethanol does not interfer; formaldehyde can be

* Associate Professor, School of Police Admin. and Public Safety, Michigan State Univ., E. Lansing.
† Director, N. Y. State Police Lab., Albany.

detected by determination without permanganate. (JDN)

Thin Layer Chromatography in Toxicology—G. Machata, *Mikrochimica Acta*, 1960(1): 79–. The preparation of thin layers of silica gel is described. Chromatograms developed on these sheets can be detected by more vigorous spray reagents than those used in paper chromatography. All of the spectra of criminalistic material already discussed in other literature can be processed by this means. (JDN)

Symposium—Breath Alcohol Tests—*Journal of Forensic Sciences*, 5(4): (October, 1960.)

The Evolution of Modern Instruments for Breath Alcohol Analysis, R. F. Borkenstein. A brief historical review of breath alcohol instruments from the time of Noah and his Ark to the present. The LaMotte Outfit, Drunkometer, Alcoholometer (Alcometer), portable Intoximeter, Drunkotester, Breathalyzer, Photoelectric Intoximeter, and Alcotest are discussed. Principles of operation of the more reliable and accepted of the methods are discussed in some detail.

Physiological Factors Affecting Breath Samples, L. A. Greenberg. Discussion of the physiological factors affecting the breath tests. Full recognition and acknowledgment of its limitations and conditions which may affect its accuracy are as essential to its increasing and sustained acceptance as is the validity of the principles upon which it is based. Limitations can neither be ignored nor concealed but must be dealt with openly in order to evaluate the merit of breath tests.

Necessary Scientific Safeguards in Breath Alcohol Analysis, K. M. Dubowski. The major elements of any breath alcohol analysis system include (1) the scientific principles underlying the test method, procedure, and practices; (2) operator competency, skill, and performance; (3) apparatus and equipment, including reagents and all other components; (4) analysis, procedure, and performance; (5) samples; (6) records. It is obvious that each component element of the system must be valid, reliable, and inherently acceptable in order for the entire breath alcohol analysis system to be capable of producing consistently proper results. Justifiable confidence in breath alcohol analysis results can be drastically increased by the relatively simple and practical means of performing duplicate or replicate analyses on a given subject in rapid succession. This technique of increasing the certainty of the result, in fact, exploits three of the major advantages of breath alcohol tests: Rapid, simple, and non-traumatic sampling, relative simplicity of the analysis, and rapidity of the complete analysis.

Alcohol Testing Programs in Europe, R. Breitenecker. The Alcotest, because of its simplicity, low cost of operation, and its ready availability, is widely used throughout Europe. Blood and urine analyses are performed more frequently than breath tests. Blood alcohol tests are the most widely used in all countries except England, where urine alcohol has been adopted. The traffic laws of several European countries have been revised to cope better with the rising toll of traffic accidents relative to the influence of alcohol. Penalties are now higher, and there is a general tendency towards obligatory biochemical tests. (WEK)

Forensic Pathology Seminar—Conducted by Arnold F. Strauss, and Geoffrey T. Mann, *Journal of Forensic Sciences*, 5(4): (October, 1960). Continuation of the seminar discussion of case history, microscopy, medico-legal problems, and other phases of three different cases:

10. Problems in determining the fatal agency
11. Systemic varicella
12. Primary pulmonary arterial and arteriolar disease. (WEK)

Symposium—Deaths Due to Anesthesia—*Journal of Forensic Sciences*, 5(4): (October, 1960).

Deaths Associated with Anesthesia, J. E. Campbell. 195 deaths associated with anesthesia during a 30-month period were autopsied and extensively studied microscopically. The author concludes that the majority of deaths associated with anesthesia are surgical misadventures. The development of thorough post-mortem studies including quantitation and distribution of anesthetic agents, serologic examination, and biochemical studies, together with the complete autopsy and correlation with thorough and accurate clinical data, will elucidate the mechanisms of deaths associated with anesthesia. As more basic data are accumulated, the unexplained death becomes a rarity.

Anesthetic Mismanagement in Operative Mortality, W. A. Weiss. The author attempts to thoroughly investigate the etiological factors associated with 200 operating room and post-operative fatalities. He determined that anesthesia

was involved as the mode or precipitating and contributory factor in 57 of the 200 cases. Anesthesia mismanagement accounted for 18 of these 57 cases or only 9% of the overall 200 cases studied. The compulsory reporting of operating room, recovery room, and intensive care unit deaths must be policed. Incomplete and poorly kept clinical charts can hamper an accurate survey.

Toxicological Problems of Local Anesthesics, R. V. Blanke. 1. Due to the various effects elicited by toxic amounts of local anesthetics, it is sometimes difficult to decide whether death is due to the local anesthetic or to other causes.

2. If the local anesthetic is the agent responsible, it is again sometimes difficult to decide whether death was due to an overdosage or to an abnormal response to the drug.

3. Frequently, toxicological analysis of postmortem specimens is the only means by which the problem can be resolved. If the local anesthetic is an amide, the analysis can be carried out by the methyl orange procedure as long as no interfering compounds are present.

4. If the local anesthetic is the ester type, it is rapidly hydrolyzed by serum cholinesterase and almost none of the intact drug can be detected. This can be partially prevented by collecting specimens immediately after death and inhibiting the enzyme activity by the addition of sodium fluoride or sodium arsenite or freezing. The intact drug can then be determined by a variety of methods.

5. In favorable cases, the amount of local anesthetic originally present can be estimated by determining one of the hydrolytic products, the aromatic acid. A case is cited illustrating this method. (WEK)

An Unusual Gunshot Wound of the Head—Leo Lowbeer, *Journal of Forensic Sciences*, *6*(1): (January, 1961). A discussion of the notorious capriciousness of gunshot wounds. The author reports a case in which, owing to a misfire caused by faulty ammunition, a bullet propelled out of its chamber remained stuck in the barrel of a .32 caliber Colt single action army revolver. When the trigger was pulled again, a second bullet propelled the first one out of the barrel, and both bullets traveled in tandem, creating a single bullet hole in the scalp; a single bullet hole in the skull, and a single bullet canal through the brain at the end of which both bullets were found like peas in a pod. This was not considered the fatal shot. The victim was killed by a previously fired shot which caused a fracture at the base of the skull extending into the ethmoid sinuses, and death occurred because of extensive blood aspiration into the lungs and pulmonary edema. (WEK)

Symposium—Drugs and Modern Society—*Journal of Forensic Sciences*, *6*(1): (January, 1961).

Control of Drugs by the Food and Drug Administration, J. L. Harvey. The Food and Drug Administration has responsibility to enforce laws regulating quality, purity, and labeling of some sixty billion dollars worth of food per annum. In addition to safeguarding food and drugs, the Administration also regulates cosmetics and therapeutic and diagnostic devices. The Commissioner discusses the operation of the Food and Drug Administration and places special emphasis upon the laboratory identification of some of the unusual problems presented to his agency.

New Drugs in Medical Practice: Onus of "Experimentation" as a Medicolegal Hazard, F. J. Evans. A primary tenet of the Hippocratic oath is that "the doctor shall do no harm". On the other hand, it is an established rule of law that the physician must keep up with advancements, must keep abreast of progress made by his profession, and must employ them suitably in his practice. This places the physician in a paradoxical position. Although it is his duty to keep up with advancement, it is also his duty to refrain from experiments. The rapid introduction of new drugs, as well as new and novel methods of treatment, into the therapeutic armamentarium has placed the physician in an uncomfortable medico-legal squeeze. The author, as a final admonition for precautions to be followed, quotes from Witthaus and Becker's *Medical Jurisprudence, Forensic Medicine, and Toxicology*, Second Edition, Volume 1, Page 36, "the law does not recognize the right of the medical or surgical practitioner to tamper with the patient's health by the use of untried experiments—without imposing upon the practitioner's liability".

Identification of Drugs and Related Materials, B. J. White. Recent advances made in the synthesis of organic compounds, drugs, insecticides, etc., have taxed existing analytical schemes of qualitative organic analysis. The author briefly discusses a few of the analytical methods and instrumentation available. He points out that

"the condition and environment of the unknown will many times handicap the X-ray, infrared, ultraviolet, chemical, and optical methods of analysis, but all of them employed together may enable one to make an identification which would not otherwise be possible".

The Impact of Hazardous Substances on Modern Society, B. E. Conley. The author endeavors to present a panoramic picture of the impact of hazardous chemicals such as cosmetics, pesticides, food additives, and contaminants upon modern society. He does not discuss the many hazards of highly specialized nature such as those present in the industrial environment, accompanying radiation, or following pollution of the atmosphere and streams. Time did not permit his discussion of these environmental health hazards.

The Indole Nucleus, a Common Denominator of Psychotropism? V. M. Sim. Some of the history of psychically active substances, Bufotenine, Tryptamine deratives, Mescaline, and the ergot alkaloids, is related, and the effect of the identified structures in man has been described. Some of the chemical structural characteristics have been found to be similar and in some instances, identical. That there is a single common denominator seems unlikely, but additional physiological and chemical knowledge will soon provide some of the answers.

Impact of New Drugs on Forensic Pathology, F. P. Cleveland. Pharmaceutical companies are constantly developing newer and better drugs for the physician to employ in the preservation of health. The chemical industry is producing insecticides, germicides, fungicides, herbicides, cosmetics, food containers, food wrappings, food additives, and flavoring agents, all of which are intended to better living conditions and preserve health. The forensic pathologist become witnesses of the effects of these compounds upon the human being. Our author, a pathologist, points out that careful and complete necropsies are essential, chemical analyses of the viscera are vital, and a sober considered analysis of the case in light of all available data is an absolute requirement. Our colleagues may write in terms of association between drugs and reactions, but pathologists must show positive relation and correlation.

Tranquilizers—Myth, Magic, or Necessity, N. Blackman.

1. Ataractic drugs have proven useful when administered for specific psychiatric syndromes to achieve a specific goal.

2. There is need for better surveillance of clinical research in the utilization of new tranquilizers. The availability for marketing of a new drug should be postponed until both efficacy and degree of toxicity are well established.

3. The indiscriminate use of tranquilizers by ambulatory neurotic patients is by no means justified.

4. There is danger that popular demand for tranquilizers may obscure the definite progress being made in the field of psychopharmacology.

5. Modern man cannot relegate his doubts or concerns about the meaning of his existence to the temporary palliative effect of a pill.

Poisoning by New Drugs—Report of a Fatality due to Suicidal Ingestion of Tofranil (R), H. C. Freimuth.

1. The increasing number of new drug products, with little information available concerning methods of detection and estimation of them, make the problems of the toxicologist and pathologist more complex each year.

2 An illustrative case involving multiple drug ingestion with synergism and potentiation is cited.

3. A death due to Tofranil (R) poisoning is described together with the results of tissue analyses for this drug. Analytical methods used in identification also described.

Drugs and Questioned Document Problems, H. J. E. Gesell. There is a definite relationship between brain, nerve, and muscle functions and handwriting, and the brain is the central control system or area from which all actions emanate. Handwriting is closely related to brain functions. Therefore, any brain malfunction oftentimes will produce specific changes from normal writing. The writer concludes that we can safely state that drugs do have an effect upon the handwriting of an addict. However, to what extent is problematical, at least at this time. Experiments, no matter how well organized, always present drawbacks and problems. The most fertile imagination cannot equal reality. Again, the most recent advances of science in the drug field and new drugs which are being discovered practically every day, also play an important part in a study of this nature. This study is an attempt to approach the subject from the view of the document examiner regarding effect of drugs on handwriting, and is by no means complete. However, it should spur on those who may be interested in further study and research. (WEK)

Wood Identification: Limitations and Potentialities—B. F. Kukachka, *Journal of Forensic Sciences*, *6*(1): (January 1961). Identification of wood presents some rather difficult problems, because a wood specimen may come from anywhere in the world. Therefore, a given specimen may be any one of 2,000 genera and approximately 99,000 species. There is no universal key to the identification of the woods of the world. Then how is it possible to make accurate identifications of wood? The author discusses some of the prerequisites necessary in order to accomplish what seems to be impossible. He concludes by stating, "At the present time, it appears that the future specialist in this field will have to be an anatomist as well as a chemist. His training in anatomy will be useful in determining the generic identity of the wood in question, and his training in chemistry will be valuable for the determination of the exact species involved." (WEK)

Rapid Micro Screen Test for Methanol in Serum and Cerebrospinal Fluid—L. A. Williams, R. A. Linn, and B. Zak, *Journal of Forensic Sciences*, *6*(1): (January 1961). A simple rapid technic utilizing micro quantities of serum and spinal fluid has been described for the determination of methanol. The proposed method involves direct oxidation in spinal fluid or serum filtrates followed by chromotropic acid reaction with the resultant formaldehyde. Recovery and precision studies show the procedure to be adequate. (WEK)

Identification of Noxious Gases in Post-Mortem Pulmonary Air—H. Kade, and R. J. Abernethy, *Journal of Forensic Sciences*, *6*(1): (January 1961). Three separate gas inhalation fatalities are discussed: (1) inhalation of cyclopropane, (2) suicide with natural gas, and (3) industrial death—inhalation of argon. Significant levels of cyclopropane and illuminating gas were demonstrated by chromatography, despite arterial embalming. A high concentration of argon was verified by mass spectrometric analysis, despite not only embalming, but also assiduous resuscitation attempts. The results indicate that neither of these procedures will necessarily subsequently prevent the possibility of a satisfactory gas determination. Pulmonary air, collected as described, should be analyzed in all autopsies where lethal gas inhalation is suspected, even though some seemingly deterrent factors exist, such as were present in these cases. Mass ligation of the pulmonary hilus requires no special equipment and only little additional effort; a suitable air-tight container (unused one-gallon tin can) is readily obtainable from most paint or hardware stores.

The authors conclude that although their experience with recovery and identification of gas from post-mortem pulmonary air is limited to the three cases, it would seem likely that other noxious gases or vapors may equally be demonstrable by similar techniques, or by such modifications as might be appropriate for the particular problem. (WEK)

Toxicity Associated with Phenurone Therapy—J. Pfaff, Jr., and D. L. Forbeck, *Journal of Forensic Sciences*, *6*(1): (January 1961). A case of toxic liver necrosis from Phenurone therapy is presented. There are now 9 reported deaths iatrogenically related to Phenurone therapy. The toxic effect of Phenurone seems more likely related to individual susceptibility than to either the daily or total accumulative drug dosage. In a majority of toxic hepatitis cases, drug withdrawal and efficacious therapy instituted promptly result in recovery. Evidence presented to this date does not support the belief that Phenurone causes aplastic anemia. (WEK)