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Police Science Notes

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POLICE SCIENCE NOTES*

Plaster Casts of Footprints—The January-March, 1936, number of the *Police Journal* (London) contains two articles dealing with methods of making plaster casts of footprints or other impressions in soil.

Constable F. Elmes, of the Dorsetshire Constabulary, in an article entitled "Footprints," recommends dental plaster as the best medium for taking casts at the scene of the crime because little apparatus is required, only a slight degree of skill is necessary, and the results obtained through its use as regards reproduction of detail are entirely adequate for identification purposes. The author gives the following directions for making a plaster cast of a footprint:

"Sufficient water is placed in a bowl or basin to make the quantity of plaster required for the job in hand. The plaster is then slaked on to the water with a large spoon, each spoonful being allowed to sink before the next is thrown on. Movement should be rapid and does not take the amount of time the explanation suggests.

"When it is thought that sufficient plaster has been added, and this is indicated by the plaster sinking more and more slowly, the mixture is given a short, rapid stir and is ready for use. No fixed proportion of plaster to water is advised, as the best results are obtained after a little experience by using the 'feel' of the mixture when stirred as a guide. The mixture

should be about the consistency of ordinary cream. * * *

"For taking casts in ordinary garden earth the bottom or floor of the print should be carefully but quickly covered with plaster ladled in with a spoon. When this has been done the rest of the plaster can be poured on and the whole left to set." * * *

In the other article, under the title, "Scientific Aids in Criminal Investigation," the author, Dr. F. G. Tryhorn, describes, in considerable detail, the procedure of making plaster casts, and gives a number of helpful suggestions for the preparation of reproductions of footprints. If the soil in the impression is wet the author recommends that it first be lubricated by spraying with linseed oil to prevent the plaster from adhering tenaciously to the soil; for binding the surface of a print in sandy or dusty soil he suggests spraying the print with a solution of shellac in methyl alcohol or with a cellulose acetate solution of the following composition: cellulose acetate, 4 g.; acetone, 50 cc.; benzene, 24 cc.; rectified spirit, 24 cc.; benzyl alcohol, 3 cc.; triphenyl phosphate, 1.5 g. In making the solution the cellulose acetate must be allowed to dissolve slowly over a period of two or three days and the use of heat avoided. As a means of slowing down the rate of setting of the plaster when an intricate cast is to be made, the author offers a unique method. He states: "For practical

* Edited by Fred E. Inbau and M. Edwin O'Neill of the Scientific Crime Detection Laboratory of Northwestern University School of Law.

purposes control of setting is best obtained by mixing urine with the water before adding the plaster. A sample of plaster which, when mixed with water alone, showed first signs of setting after four minutes and was thoroughly set in fifteen minutes gave, when mixed with water containing 12½ per cent urine, figures of 8 and 21 minutes, and, with 25 per cent urine in the water, figures of 40 and 90 minutes respectively." The correct proportions of plaster and water, according to Dr. Tryhorn, are obtained when 25 ounces of plaster of paris are mixed with one pint of water. He states further: "To avoid the need of weighing the plaster and at the same time to eliminate guess work in mixing it is useful to remember that 6½-7 volumes of plaster of paris require 4 volumes of water. For instance, to make a cast of an average sized footprint an ordinary tea-cup will serve as a measure, and a mixture of 6½-7 cupfuls of plaster with 4 cupfuls of water will give a quantity suitable for the purpose." Casts should be kept in a warm room or near a radiator for one or two days before being packed, and if the cast is to be handled much its surface should be protected by immersing it for about fifteen minutes in waterglass solution.

New Positive Film as an Aid in Firearms, Fingerprint, and Questioned Document Comparisons—Accepted methods heretofore employed in the comparison of individual characteristics of fired bullets or shells have involved either the use of the comparison microscope, where the surfaces of the objects are examined in juxtaposition, or, as an alternative,

"matched" bromide enlargement prints which are superimposed "fatal" over "test," for the purpose of illustrating the individual points of similarity.

The use of Translite film, recently announced by the Eastman Kodak Company of Rochester, New York, makes possible certain identifications which by the other methods would be impossible.

Translite is a double coated cellulose acetate film. The emulsion on either side of the film is comparable in contrast and sensitivity to Eastman regular Vitava Opal emulsion. The surface of the film has been treated so that it has a very fine texture, approximating the appearance of ground glass. Thus, when the Translite film is used in projection or contact printing, transparent positives of both "test" and "fatal" are made. By superimposing "test" over "fatal" and illuminating from the rear with a diffused source, it is possible to align and demonstrate individual striations or characteristics which may be common to both test and fatal exhibits.

A case was recently referred to the Scientific Crime Detection Laboratory which involved the comparison of fired 12-gauge shotgun shells. The breech face markings on the primer cups were not tool or finishing striations extending across the surface of the breech block but were, instead, the reverse impressions of pock-markings on the breech block, the "pitting" or "pock-marking" due probably to erosive effects of gas, or possibly corrosion. The size, shape, and orientation of the reverse impressions of these individual pock marks did not lend themselves to a comparison microscope study. By making photomicrographic nega-

tives, and from these Translite positives of both test and fatal shell primers, and superimposing these transparent positives, it was possible to demonstrate an excellent "match" or comparison of the shape, size, and orientation of the breech face "pock-markings" transferred to the base portion of the primer cups in the process of firing.

The use of Translite film suggests definite possibilities when applied to the problem of comparison of fingerprints and palm prints, and also in the examination of questioned documents when signatures are suspected of being tracings, or in the comparison of individual characteristics of typewritten material.—*Charles M. Wilson.*

Document Examination—Standards to Jury Room—Experiments by Jury in Jury Room—Expert Witnesses—The opinion of the Supreme Court of Illinois in the recent case of *People v. White*, 6 N. E. (2d) 1015 (1937), should be of considerable interest to expert witnesses generally and to document examiners in particular. It concerns several important legal problems in connection with expert testimony.

The defendant in this case had been charged with "uttering, publishing, and passing" an alleged forged note. The evidence on the part of the prosecution indicated that a certain signature was a traced forgery, made by placing a sheet of carbon over the document in question and then tracing the genuine signature superimposed upon the carbon paper, which was thereafter retraced in ink. The defense contended that the signature was genuine and had been partly retraced by the purported signer (an elderly gentleman since de-

eased), and in the presence of the defendant who called to the signer's attention the fact that the original signature had not been very distinct. Skilled witnesses appeared for both sides to uphold each contention.

At the conclusion of the trial the jury were permitted, over the defendant's objection, to take with them into the jury room standard specimens of the alleged signer's signature and also a "reading glass." Upon appeal this was held to constitute error, for the following reasons: "The jury had the benefit of the evidence of the witnesses who expressed an opinion of forgery by a comparison of the denied signature with the genuine signatures. In criminal cases the comparison contemplated is to be made during the reception of the evidence—not without the presence of the defendant. The jury had with it the reading glass, which they could use in comparing and examining the genuine signatures and the disputed one. . . . It was reversible error to permit such exemplars to go to the jury room."

Another ground for reversal consisted of the argument to the jury by the prosecuting attorney who urged the jury to conduct some of their own experiments in tracing signatures, with a view to determine the unreasonableness of the defendant's contention. To this the defense objected, but the objection was not sustained. Upon appeal the Supreme Court held: "It was not proper for the jurors to conduct experiments of this character outside of the presence of the parties. What effect their own efforts, successful or unsuccessful, to trace a carbon impression of a signature or to write a signature with a pen which was practically dry and then

retrace it might have upon their verdict is unknown. Matters which may be wholly incompetent growing out of such efforts to trace or retrace a signature may have materially affected the conclusion reached by the jury. The defendant would thus be deprived of the benefit of section 9 of article 2 of the Constitution which guarantees every defendant in a criminal case the right to 'appear and defend' and 'to meet the witnesses face to face.' The effect of the court overruling the objection would normally convince the jury that it was perfectly proper for them to engage in such experiments, demonstrations, and tests in deciding the question of the guilt or innocence of the defendant. Demonstrations and tests ordinarily are not permitted to be conducted in the court room even though in the presence of the jury and the parties. It follows that encouraging the jury to make such tests in the jury room outside the presence of the parties was highly improper."

A physician was permitted to testify that he had had occasion to examine the eyes of the purported signer of the questioned document about the time of the alleged signing and that in his opinion this person "could not have retraced his signature" as it appeared on the questioned document. This also was held to constitute error. Said the court: "This testimony was highly prejudicial. The question of retracing was not a medical nor a scientific one. There was no evidence that (the signer's) nervous system was not normal. It was proper for the physician to detail (the signer's) physical condition and the condition of his vision on the occasions when he saw him so the jury might have before them

the state of the man in those respects, but the answer given invaded the province of the jury. This witness purported to decide by his opinion a material issue in the case."

Another feature of this case is described in the following quotation from the court's opinion: "In cases of this kind the testimony of competent and unbiased experts may be very helpful to both the court and jury in arriving at the justice in the case, but their evidence is to be subjected to the same tests applicable to other witnesses. The record shows the defendant's counsel made a strenuous effort in cross-examination to learn what compensation one of the professional experts for the People expected to be paid for his services, or what his contract, if any, was therefor. The witness consistently evaded answering the questions and the cross-examination upon that subject was fruitless. While the compensation paid an expert witness and the circumstances of his employment are not controlling and do not necessarily discredit the witness, yet these are facts which are proper to go to the jury, to be considered by them, with the other facts and circumstances in evidence, in determining the amount of credit to be accorded the testimony of such witness. A professional expert witness should not be a partisan. His function is to give truthful testimony upon and about the matters upon which he may be interrogated. His sphere is not that of an advocate for the side of the controversy by which he is employed."

Firearms Identification — Powder
Pattern Experiments—Admissibility

When Cardboard Used—The Supreme Court of Louisiana, in the recent case of *State v. Bass*, 186 La. 139, 171 So. 829 (1937), held that it was error for a trial court to admit in evidence the result of powder pattern experiments, made for the purpose of approximating the distance at which a person had been shot, where the substance fired upon in the experiments consisted of cardboard. The court was of the opinion that the experiments were not made under conditions and circumstances "substantially similar to those attending the alleged occurrence." The nature and texture of cardboard were thought to be "fundamentally different" from that of the human body; and the record in the case failed "to disclose any expert testimony to show that there is any similarity between cardboard and human skin and flesh in registering powder burns and marks."

This case also involved a situation where the barrel of the gun used in the experiment was $\frac{1}{2}$ inch shorter than the actual gun with which the deceased had been killed. No evidence appeared as to why the evidence gun itself had not been used for experimental purposes but witnesses testified that "there would be no material difference in the results." This, as well as the fact that the same make of cartridge had not been used (although the same type of powder, black powder, was duplicated), did not meet with full approval of the court. However, the decision was based principally upon the fact that in the absence of any showing that cardboard would register a powder pattern similar to that of human flesh, the conditions and circumstances of the experiments could not be considered "substantially

similar to those attending the alleged occurrence."

Plaster Casts of Perishable Evidence—Admissibility in Criminal Trial—Marking of Exhibits—In *State v. Weston*, 64 Pac. (2d) 536 (Ore., 1937), the prosecution introduced in evidence a plaster cast of the arm of a homicide victim for the purpose of demonstrating the effect of certain gunshot wounds. To the admissibility of such evidence the defendant objected, and for the following reasons: (1) Recourse to the cast was unnecessary, because witnesses could correctly describe the wounds without such assistance; (2) After certain blue dots were placed on various parts of the cast to indicate the wound areas the cast was no longer a true representation of the deceased's arm; and (3) the cast constituted a gruesome object and was therefore prejudicial to the defendant's interests. Upon appeal, the Supreme Court of Oregon disposed of the first contention by stating that the use of the cast "must have conveyed to the jury a better understanding of the evidence than mere words could have afforded." As to the second basis for the objection the court stated: "Without the blue markings one unfamiliar with casts would have experienced difficulty in locating the wound indication and might have been deceived by the air bubble holes. In our examination of the cast, we have noticed that some of the wounds, as represented upon the cast, are very shallow and therefore difficult to discern. The jury was amply informed that the sole purpose of the blue dots was to indicate the presence of the wound. Since the jurors could rightfully

look at the indications of the wounds, we cannot understand how the help which these small dots gave them in locating the wounds could have prejudiced any interest properly claimed by the defendant." In response to the third contention the court stated that it was clearly satisfied that the cast served a permissible purpose and not one of prejudice. "The cast, in our opinion," stated the court, "while not pleasing to the eye, possesses little of a gruesome nature and is not more obnoxious than would be any model, cast, or photograph showing the results of a brutal act. Since the cast could very effectively help the jury in arriving at a correct understanding of the facts, they were not to be denied this help because the cast's appearance was not agreeable."

Admissibility of Evidence Obtained by Dictaphone—In *People v. Schultz*, 64 Pac. (2) 440 (Calif., 1937), the prosecution introduced in evidence testimony of witnesses who had heard over a dictaphone incriminating conversations had by the de-

endant with certain other persons. The defense objected on the ground that the witnesses had not seen any of the persons whose voices they had heard by means of the dictaphone, and also because of the fact that the witnesses, according to their own admissions, had caught only a part of the conversations. The trial court overruled the objection and admitted the evidence. Upon appeal the ruling of the trial court was approved in the following language: "There are other ways of identifying voices than by seeing the party who is talking, and a person is not obliged to hear and catch all of the conversation in order to relate the part of it he does hear and catch."

Firearms Identification—The Supreme Court of Missouri in the recent case of *State v. McKeever*, 101 S. W. (2d) 22 (1936), held admissible in evidence expert testimony as to the identity of a fatal bullet in comparison with a test bullet which had been fired into the ground some ten years previous.

Second Annual Short Course or Seminar for Prosecuting Attorneys—A second annual short course of instruction—in effect a seminar—designed particularly for prosecuting attorneys and their assistants, will be offered by *Northwestern University School of Law*, through the facilities of its *Scientific Crime Detection Laboratory*, during the six day period from August 2 to August 7, 1937, inclusive.

The major portion of the program consists of a series of lectures and demonstrations by the Staff of the *Scientific Crime Detection Laboratory* in the various scientific methods of crime detection. The primary purpose of this is to familiarize the attendants with the possibilities of the application of scientific methods to criminal investigations.

As regards the more rudimentary aspects of scientific criminal investigation, such as the preservation of perishable evidence, there will be special instruction in the particular techniques or procedures

involved so that the attendants may become qualified to do such work themselves or have it done under their direction and supervision.

Much attention will be devoted to the preparation, for trial, of a case involving scientific evidence, and also to the legal status and application of such evidence. Moreover, provision has been made for group discussions concerning the general problems of the office of prosecuting attorney.

Following is a copy of the curriculum for the six day period:

MONDAY, AUGUST SECOND

<i>Time</i>	<i>Subject</i>	<i>Lecturer</i>
9:00-10:00	Registration: Lincoln Hall, Northwestern University School of Law, McKinlock Campus, Chicago, Illinois	* * *
10:00-10:50	"The Office of Prosecutor"	<i>Leon Green</i> Dean, and Professor of Law
11:00-11:50	"Criminal Investigation"	<i>Leonarde Keeler*</i> Associate Professor of Law in Psychology
1:30-2:20	"Photography in Criminal Investigation"	<i>Charles M. Wilson*</i> Assistant Professor of Police Science
2:30-3:20	"Document Examination"	<i>Katherine Keeler*</i> Examiner of Questioned Documents
3:30-4:20	"Medicolegal Problems"	<i>C. W. Muehlberger*</i> Coroner's Toxicologist, Cook County, Illinois; Lecturer in Forensic Chemistry

TUESDAY, AUGUST THIRD

<i>Time</i>	<i>Subject</i>	<i>Lecturer</i>
9:00-9:50	"Firearms Identification (I)"	<i>Charles M. Wilson</i>
10:00-10:50	"Firearms Identification (II)"	<i>Charles M. Wilson</i>
11:00-11:50	"Microanalysis; and Personal Identification"	<i>M. Edwin O'Neill*</i> Instructor of Police Science

* Scientific Crime Detection Laboratory.

1:30-2:20	"Legal Decisions on Photography; Document Examination; Medicolegal Problems; Firearms Identification; Microanalysis; and Personal Identification"	<i>Fred E. Inbau*</i> Assistant Professor of Law
2:30-3:20	"Detection of Deception (I)"	<i>Leonarde Keeler</i>
3:30-4:20	"Detection of Deception (II)"	<i>Leonarde Keeler</i> <i>Fred E. Inbau</i>

WEDNESDAY, AUGUST FOURTH

<i>Time</i>	<i>Subject</i>	<i>Lecturer</i>
9:00-9:50	"Forensic Chemistry"	<i>C. W. Muehlberger</i>
10:00-10:50	"Comparative Micrography (I)"	<i>M. Edwin O'Neill</i>
11:00-11:50	"Comparative Micrography (II)"	<i>Charles M. Wilson</i>
—————		
1:30-4:30	Demonstrations and Experiments at the Laboratory	* * *

THURSDAY, AUGUST FIFTH

<i>Time</i>	<i>Subject</i>	<i>Lecturer</i>
9:00-9:50	"Tests for Alcoholic Intoxication"	<i>C. W. Muehlberger</i>
10:00-10:50	"The Practical Use of Wire-Tapping and Dictaphone Equipment"	<i>Charles M. Wilson</i>
11:00-11:50	"Legal Decisions on Detection of Deception; Comparative Micrography; Forensic Chemistry; Wire-Tapping and Dictaphone Recordings."	<i>Fred E. Inbau</i>
—————		
1:30-4:30	Instruction and Demonstrations in the Making of Casts of Perishable Evidence	<i>M. Edwin O'Neill</i>

* Scientific Crime Detection Laboratory.

FRIDAY, AUGUST SIXTH

<i>Time</i>	<i>Subject</i>	<i>Lecturer</i>
9:00-9:50	"Bombs and Explosions"	<i>C. W. Muehlberger</i>
10:00-10:50	"The Preparation and Trial of Criminal Cases"	<i>Mal J. Coghlan</i> Assistant State's Attorney, Cook County, Illinois
11:00-11:50	Open Discussion of Some Practical Problems of the Office of Prosecuting Attorney—Conducted by	<i>Mal J. Coghlan</i>
—————		
1:30-4:30	Demonstrations and Experiments at the Laboratory	* * *

SATURDAY, AUGUST SEVENTH

<i>Time</i>	<i>Subject</i>	<i>Lecturer</i>
9:00-9:50	"Personnel Problems of the Office of Prosecuting Attorney"	<i>Newman F. Baker</i> Professor of Law
10:00-10:50	"The Examination and Cross-	<i>Fred E. Inbau</i>
11:00-11:50	Examination of Expert Witnesses"—Demonstrations.	<i>C. W. Muehlberger</i> <i>Charles M. Wilson</i>

A nominal fee of fifteen dollars (\$15.00) constitutes the entire Laboratory and Law School tuition, and also includes the cost of the Laboratory's "Outline of Scientific Criminal Investigation."