

Winter 1935

Observations in a Case Involving Powder Patterns and the Fallibility of Eye-Witnesses

Charles M. Wilson

Follow this and additional works at: <https://scholarlycommons.law.northwestern.edu/jclc>

 Part of the [Criminal Law Commons](#), [Criminology Commons](#), and the [Criminology and Criminal Justice Commons](#)

Recommended Citation

Charles M. Wilson, Observations in a Case Involving Powder Patterns and the Fallibility of Eye-Witnesses, 26 Am. Inst. Crim. L. & Criminology 601 (1935-1936)

This Criminology is brought to you for free and open access by Northwestern University School of Law Scholarly Commons. It has been accepted for inclusion in Journal of Criminal Law and Criminology by an authorized editor of Northwestern University School of Law Scholarly Commons.

OBSERVATIONS IN A CASE INVOLVING POWDER PATTERNS AND THE FALLIBILITY OF EYE-WITNESSES

CHARLES M. WILSON†

In criminal cases the possibility of utilizing scientific techniques in the establishment of judicial proof is very often not fully appreciated until much valuable evidence, considered so in retrospect, has been destroyed or overlooked. It is under such conditions that frequently the prosecuting attorney finds it necessary to attempt to obtain by an indirect method information and evidence which could have been obtained much easier and more satisfactorily during the original investigation. An illustration of this is to be found much too often in cases involving firearms where an important issue arises as to whether or not a deceased person met death as the result of suicide or murder.

The writer had occasion to be consulted in such a case recently. The victim had been disinterred without any particular study having been made as to the extent of the powder burns on his body, and when the case came to the attention of the prosecutor he was faced with the problem of convincing the jury that death resulted from shooting by a person other than the victim. It was only then that the powder pattern on the deceased's body received any serious consideration. But the best bit of evidence was gone, and all that remained was a photograph of the entire body. For the purpose of a study of the powder pattern with a view of approximating the distance at which the gun had been fired this photograph proved to be very unsatisfactory. Nevertheless, a careful examination was made of it in order that it could be used as a standard for comparative purposes, being considered, of course, in light of this limitation. In addition to utilizing this photograph and the making of experiments of a comparative nature, the writer interviewed a number of witnesses, who had observed the body of the deceased, and obtained from them statements regarding their recollection of the nature of the powder pattern. A tabulation of the results obtained from both methods proved to be sufficiently interesting to merit the recordation given in this paper.

On the afternoon of December 30, 1934, a physician responded to an emergency call from the residence of S. L. De Long, a farmer

†Research Engineer and Instructor of Police Science, Scientific Crime Detection Laboratory, Northwestern University School of Law.

residing in Fayette County, Iowa. Upon his arrival he pronounced Mr. De Long dead, as the result of a bullet wound in the head. The coroner and sheriff were summoned, as well as a photographer, who made several photographs of the body as it lay on a sofa.

The physician's testimony given before a grand jury, which was considering a murder indictment against the deceased's wife, contained the following statement:

"I found the deceased in a reclining position on a sofa, right leg crossed over the left, left arm prone beside him, right arm dropped over the edge of sofa, mouth open, lids closed, glasses in position, head reclining on pillow."

A postmortem examination revealed "a wound in the malar bone on the right side one-half inch in front of the right ear." "The right external ear was black with burnt powder marks. X-ray pictures were taken which showed the position of the bullet to be about one inch to the left of the medium line and about three-quarters of an inch above the floor of the cranial vault about one and a half inch posterior to the anterior surface of the frontal lobe."

At the time of the shooting the deceased and his wife were alone in their home. The wife denied, however, being present at the time, in the room in which the deceased's body was found.

Considerable domestic discord had existed between husband and wife according to the report and testimony of neighbors. Moreover, sometime prior to his death the defendant stated that his wife had taken from him a .32 caliber revolver which she had repeatedly refused to return to him.

On January 12, 1935, Mr. M. M. Cooney, who had been appointed as a special county attorney to direct the investigation, delivered the following exhibits to the Scientific Crime Detection Laboratory for examination:

One H. & R. "Victor Model" .32 caliber 6 shot, double action revolver, having a 2½ inch barrel.

One fired lead bullet which had been removed from the body of the deceased.

Three fired cartridge cases, .32 S. & W. of Remington manufacture, which had been found in the revolver at the time it was recovered by the sheriff.

Three loaded .32 S. & W. black powder, 88 grain lead bullets, of Remington manufacture, also found in gun at the time of its recovery.

Twenty loaded cartridges, .32 S. & W. of Remington manu-

facture, loaded with black powder and 88 grain lead bullets—found in the De Long residence.

Two photographs, as referred to previously.

The findings of the Laboratory examination of the gun, the fired bullet, and the three fired cartridge cases may be summarized as follows:

- I. The bullet was fired from the evidence revolver.
- II. The three fired cartridge cases submitted had been fired from the evidence revolver.
- III. Black powder had been used as a propellant.

Using twelve of the twenty loaded cartridges referred to above, twelve powder patterns were fired at each of the following distances: "contact," 2", 4", 6", 8", 10". Duplicate patterns were also obtained, which were consistent as to density, shape and location of partially consumed powder particles. Two of the remaining eight loaded cartridges were sent to the manufacturer so that the load could be checked and that similarly loaded cartridges could be obtained for further test purposes.

In addition to obtaining the fairly consistent patterns mentioned above, a peculiar fan-shaped flare was noted to have occurred on each pattern, extending upward. In this area the pattern was considerably more dense than in other sectors. When holding the gun with sights upward, this accentuated area was observed to occur at what might be considered "12 Noon," designating its position in terms of the hours of the clock. Throughout the tests this flare was found to vary from eleven o'clock to one o'clock.

Using the loaded cartridges which had been supplied by the manufacturer as having a similar load, twenty-eight additional patterns were made, four each at the following distances, measured from the muzzle of the arm: 2", 4", 6", 8", 10", 12", 14". A comparison of these patterns with those obtained using the ammunition which had been recovered from the deceased's home indicated close similarity. The accentuated area or flare that was referred to above was noted as occurring in all patterns made at distances from "contact" to 14". Following this, an additional set of patterns were made for the purpose of determining the consistency of this peculiarity. Approximately one hundred and twenty-five patterns were made and every one exhibited the same characteristic flare, occurring in that portion of the quadrant designated as "11 A.M." to "1 P.M."

The arm in question had been manufactured prior to 1906 and probably in the process of the fabrication of the barrel the axis of the chamfering tool was not concentric with the axis of the bore and rifling of the barrel, with the result that the top portion of the quadrant of the muzzle of the arm was relieved to a greater extent than the remainder of the muzzle. Consequently, at the instant the projectile left the muzzle, a premature escape for the expanding gases was provided by the top portion of the muzzle of the gun.

The muzzle of the arm was examined by means of a binocular microscope, and no unusual conditions were observed so far as the land or groove endings were concerned. The barrel of the arm was measured ("miked") from land to land and groove to groove, but no unusual conditions were observed. Attempts were made to make a cast of the muzzle of the arm in an effort to verify the assumption given above, but due to difficulty experienced in measuring the departures of the chamfering in the reverse impressions or negative casts made, these determinations could not be depended upon. The explanation given above, however, is a very reasonable one for the peculiar flare noted in all patterns.

Unfortunately at the time the photographs were taken of the body, no scale was included in the field of the camera, with the result that the essential dimensions in the vicinity of point of entrance of the bullet were a matter which could only be approximated by a comparison with measurements taken from the deceased's glasses which were recovered and which had also been included in the field of the camera. Using the glasses as a standard of comparison and reference, enlargements were made of the negatives submitted for examination. The conclusion reached as the result of these comparisons was that the shot had been fired at a distance of not less than eight inches and not more than twelve—in all probability in the neighborhood of ten inches.

To the end of verifying this conclusion as far as possible—since the writer had not seen the deceased—the twenty-eight patterns referred to above were exhibited to ten witnesses who had seen the actual powder burns some four months previous. Of these ten persons, three were doctors, all of whom were present at the time the post-mortem examination was made, and one was a woman. The ages of all ten witnesses ranged from thirty to sixty years.

The witnesses were called to the office of the prosecuting attorney and each was asked to select the card or cards which in his or her opinion corresponded to the density and size of the powder burn which

they had observed on the plane surface of the head of the deceased. They were asked to disregard the powder burns which were noted on the ear since that did not lie in the same plane as the area surrounding the point of entrance of the bullet.

For the inspection of these witnesses, the twenty-eight powder patterns were placed on a table, without any arrangement as to the distances at which they were fired. In other words, their positions on the table gave no indication of the firing distances they represented. Each witness viewed the cards individually, so that his conclusion would not affect the conclusion of any other witness. Each was requested to carefully examine all of the cards spread on the table and to select the card or cards which in their opinion corresponded with the powder burns they had viewed on the head of the deceased. Particular care was exercised by the writer in the matter of instructions to each witness so that no suggestion or implication as to which card or cards were to be selected by the witness.

After the first selection had been made they were requested to repeat the process and to make a second, third, or fourth choice if they so desired. The time in making the selections ranged from one minute and thirty seconds to seven minutes for one choice.

The following indicates the selections which were made:

<i>Subject</i>	<i>First Choice</i>	<i>Second Choice</i>	<i>Third Choice</i>	<i>Fourth Choice</i>
A	8"	10"	8"	—
B	6"	8"	6"	—
C	10"	8"	10"	—
D	10"	8"	8"	—
E	8"	8"	8"	10"
F	6"	10"	10"	—
G	12"	12"	—	—
H	12"	12"	10"	—
I	8"	8"	—	—
J	12"	12"	—	—

After the selections noted above had been made each witness was questioned as to whether he or she had observed any accentuation of the powder pattern in any portion of the quadrant. Of the ten, nine indicated that they had. Three of the nine stated they had paid no particular attention to it at the time but recalled that certain areas had appeared more dense than other sectors around the point of entrance. The one witness who stated he did not recall any such area was dismissed, but the remaining nine were then requested to indicate,

if possible, the sector of the quadrant which was so accentuated, using the hours of the clock to designate that area.

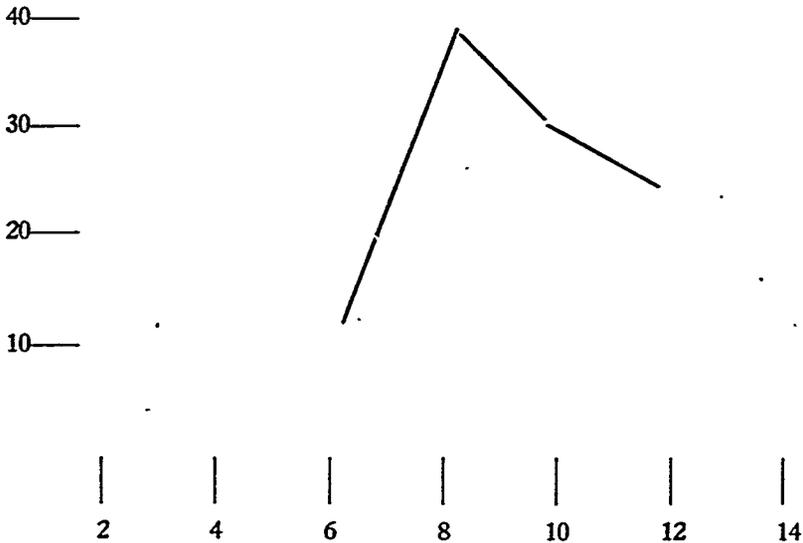


FIGURE 1—Distribution of twenty-eight selections of powder patterns (1st, 2nd, 3rd and 4th choices) made by ten witnesses. Ordinates represent percentage of total number of selections. Abscissae represent distance in inches (muzzle of gun to pattern card).

The following is a tabulation of the designations given:

<i>Subject</i>	<i>Hour</i>	<i>Subject</i>	<i>Hour</i>
A	12 Noon	F	11 A.M.
B	12 Noon	G	12 Noon
C	1 P.M.	H	11 A.M.
D	12 Noon	I	12 Noon
E	2 P.M.		

At the trial of the deceased's wife, the writer was permitted to testify regarding his conclusion as to the distance at which the shot was fired, using the photograph as the basis for comparison.¹ However, evidence as to the experiment made upon the witnesses was held inadmissible.

¹Regarding the admissibility in evidence of testimony of this nature see Inbau, F., "Scientific Evidence in Criminal Cases: I. Firearms Identification—'Ballistics,'" 24 J. Crim. L. 825 (1933), and particularly the citation of cases at pp. 842, 843. The jury in this case found the defendant guilty of shooting and killing the deceased.

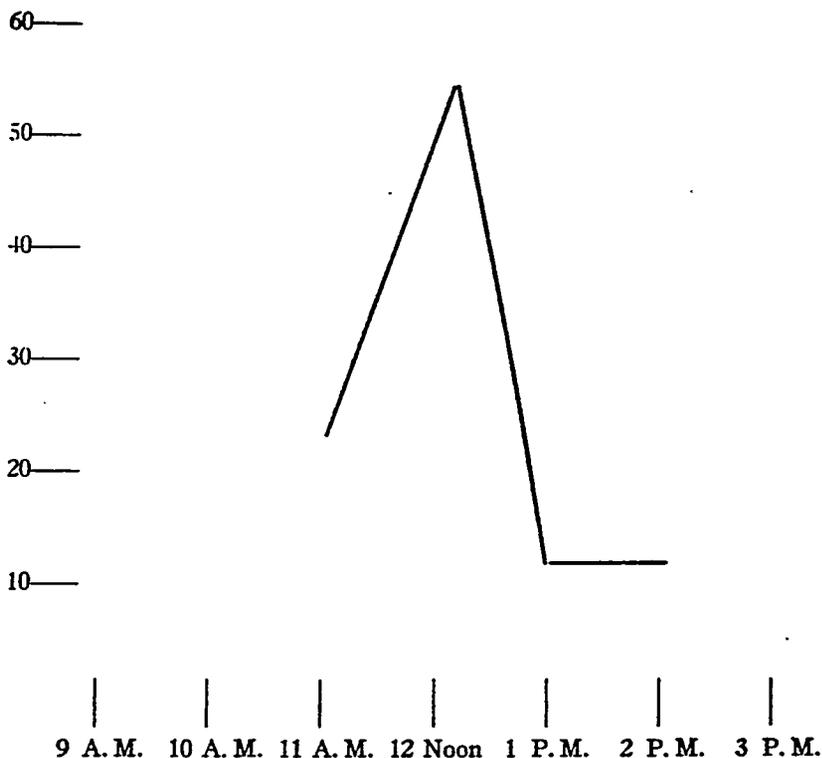


FIGURE 2—Distribution of nine quadrant selections made by nine witnesses. Ordinates represent percentage of total number of selections. Abscissae represent the hours of the clock.

The conclusions arrived at as a result of this investigation may be summarized as follows:

(1) From the peculiar powder pattern of that particular gun the writer was able to locate the plane of the arm at the time the fatal shot was discharged, as well as the approximate distance. These two factors put the gun in an almost impossible position so far as the deceased's having fired the shot himself was concerned.

(2) The witnesses were surprisingly consistent in their selection of representative patterns, considering the nature of the subject matter and the length of time (four months) intervening since their original observations.

(3) The writer's conclusion, arrived at by an indirect method of comparison of powder patterns, was in fairly close agreement with conclusions of witnesses who actually viewed the powder burns on the body of the deceased.