

Fall 1929

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Recommended Citation

H. E. Cassidy, *Ballistics Forensically Applied*, 20 *Am. Inst. Crim. L. & Criminology* 439 (1929-1930)

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BALLISTICS FORENSICALLY APPLIED

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Forensic Ballistics are two rather high-sounding words, but the use of them is required to convey briefly the information intended. The word "forensic" pertains to courts of justice; "ballistics" defines the science of projectiles. Consequently, Forensic Ballistics is the application of the knowledge of firearms, powders, and bullets to judicial problems. This paragraph may be considered academic to the knowing, but it is essential to those to whom the subject is new. It is felt that the possibilities of this form of evidence are not known to any great extent and therefore cannot be properly appreciated. The few instances that follow, showing how ballistic data have been of some service to our judiciary, may give some idea as to what can be expected from a scientific examination of the firearm exhibits which are so often introduced in our courts.

1. *An Automatic Case.* The attorney for the accused had been assured by his client that his wife had shot herself with an automatic pistol. There were not any powder nor discharge marks on the face of the deceased where the fatal bullet entered. This fact did not discourage the counselor. The attorney knew something of firearms, and of the distances the powder contained in automatic pistol ammunition could be expected to disfigure flesh. He had had considerable experience. Precedents where he practiced had demonstrated that one can easily hold an automatic pistol far enough away from head or body to keep it from recording either powder or discharge marks.

The weapon used had never been located. His client had fled with the pistol from the scene of the alleged suicide, and before he was apprehended, which was some weeks later, the firearm was claimed to have been lost. No one except his client and the deceased wife were present at the occurrence. The accused offered a reasonable explanation of the suicide, and accompanied it with plausible data connected with apparent conditions which one would reasonably expect could not be successfully contradicted.

Little headway was made by the Commonwealth at the trial of the accused until a student of ballistics identified the fatal bullet as one adapted to revolvers and rifles instead of automatic pistols. He testified that the copper-jacketed bullet was a 32 Winchester, com-

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monly known as a 32-20, and that it had not and could have not been fired through an automatic pistol. The witness explained how he knew that neither a Colt nor a Smith and Wesson make of revolver had shot this bullet, giving it as his opinion that the guilty gun was a foreign imitation of the Smith and Wesson. By the contour, base, canelure and fluting he identified the bullet as one of a particular brand. Powders extracted from similar brand cartridges dating back over a number of years were produced to show that they had always been charged with a like load of smokeless powder. This class of smokeless powder was shown to be entirely different from that used in automatic pistol ammunition. Numerous sheets of heavy, white paper were then exhibited. Into each of these sheets shots had been fired with a like ammunition and the same class of revolver testified by him to have fired the fatal bullet. These shots had been made with the muzzle of the revolver held at various distances ranging from six inches up to six feet. A study of the perforated paper by the jury convinced them that the muzzle of the revolver must have been held farther away than two feet, or there would have been cuts on the face of the woman resulting from the unexploded powder.

This conclusion on the part of the jury was probably materially strengthened by the after testimony of the accused. While the technical witness was identifying the calibre, make, and style of bullet, as well as the revolver shooting it, and the powder charge propelling it, there was observed among the jury certain toe-tapping, yawning, sky-gazing and other evidences of non-belief. The defendant followed as the next witness. At his attorney's demand that he tell the jury with just what kind of a weapon his wife shot herself, he replied; "I was wrong when I told you it was an automatic. It was a 32-20 revolver. I do not know what make it was because it had no name on it. I bought it from a Baltimore Mail Order House."

The jury, in this case, gave a twenty-year sentence after less than many minutes deliberation.

The fallacy that smokeless powders do not leave tell tale marks should be discarded. And so should the general belief that all smokeless powders are white be dismissed from the minds of many. There are, in truth, but very few even light colored smokeless powders used in small arm ammunition. Most of it is as black or nearly as black as ordinary charcoal powder. There are probably two dozen or more different shaped smokeless powders, all of which can be differentiated. Many of these powders will cause lacerations of the human flesh even when the muzzle of the weapon is held at considerable distance.

The differences in effect are, that black powder tattoos and the smokeless cuts the flesh. It has been found that markings of the flesh in smokeless powder problems may be caused from seven different agencies and conditions. Any or all of these may be important items in any suicide or murder case.

2. *A Weak Link in a Very Strong Chain.* The circumstances surrounding the murder of the wealthy old Mr. "X" so completely enmeshed his young wife, that notwithstanding her denial of guilt, the attorneys representing her were endeavoring to compromise with the state on a twenty-year sentence.

The fatal bullet was available, and so was the revolver she had in her hand when arrested. The calibre of the bullet and of the revolver was the same. Her revolver had been freshly oiled and cleaned when taken from her. Forty-five minutes had elapsed from the time of the shooting until she reported it. In the gun were five fresh cartridges. In the side yard were found the four old cartridges, but the fifth which was the supposed fatal cartridge case was never located. Bloodhounds had followed a trail from the rear door of their residence to the front door where her husband had been called to the porch and shot. The dogs had then retrailed to the rear door, indicating that the wife who was the only other occupant, had gone out the rear door, proceeded to the front porch, committed the murder and then returned and re-entered. "X" was a cross and disagreeable man. The wife was a woman with a fiery temper. She was his third wife. Mrs. "X" knew she would come into immediate possession of some \$30,000 at his death.

But the ballistic scholar in this instance discovered that the fatal bullet was of the 38 Smith and Wesson special variety. The revolver in the accused's possession was an U. S. adapted to the 38 Smith and Wesson short. The suspected revolver, for this reason, not only did not shoot the fatal bullet, but could not. A 38 Smith and Wesson special will not fit in a revolver adapted to 38 Smith and Wesson shorts.

These findings brought about a more logical consideration of the other evidence with the result that the case against the lady was nolle-prosequied.

3. *Facts vs. A Voluntary Confession.* The police were notified at midnight of a shooting in a certain residence. Investigation there disclosed a killing. The dead man, with one bullet hole in his head, was found lying on the floor of the front room among a litter of glass particles from a broken window pane. This glass being on the

inside of the room indicated a breaking in from the outside and therefore an unlawful entry. The occupant of the house, a woman, was shortly afterwards located at the home of a neighbor. She promptly gave a full account of the happening.

"I was at home alone with the exception of my eight year old son. We had both retired and had been asleep. I was awakened by some unusual noise. Seeing the outline of a man in the adjoining room, I secured my revolver from under my pillow and fired in his direction. Without waiting to see what was the result, I grabbed my child and fled."

She produced her 38-calibre revolver. It had been recently shot once, as shown by the empty shell or cartridge case that was still in it. The autopsy produced a similar calibre bullet from the head of the deceased. The land and groove marks on the fatal bullet were similar in number, width, and pitch to the riflings of the revolver.

Notwithstanding all this, and the voluntary admission of responsibility, the case turned out to be one of murder and not a justifiable homicide. The woman did not fire the fatal shot. She knew she had not when she confessed. She was not trying to protect the murderer, because she did not even know who he was. All the facts would take too much space in the telling. It will suffice to say that she had good reasons for her actions.

Through the meritorious efforts of the police officers the actual killer was arrested and convicted. Before they did this it became necessary that their previous arrest of the woman and her voluntary confession should be eliminated and discredited. Her confession was disproved through the fact that the fatal bullet was one such as is made by the U. S. Cartridge Company. The empty cartridge case in the woman's revolver was branded W. R. A. CO. which stands for the Winchester Repeating Arms Co. It was inconceivable that a U. S. bullet would have been loaded in a W. R. A. case. The two makes of bullets in this particular calibre and style are differentiated by the deep cupped out base of the U. S. and the nearly flat base of the W. R. A.

Opposing counsel did not cross-examine the witness to these facts. The evidence was of such a plain and readily understandable character that one of the jurors exclaimed, "It don't take an expert to see that."

4. *Where Numbers Checked But the Facts Did Not.* Mr. H was found dead from two bullet wounds. Mr. S, who was the last person seen with him, was arrested and tried for his murder. When

apprehended, the accused was carrying a 38 Smith and Wesson Hammerless revolver. In it were five REM-U. M. C. cartridges. At his home there was found a box containing forty-three more of the same brand and calibre cartridges. These, with the five in the revolver and the two taken from the body of the murdered man would make the full box of fifty the accused was known to have recently bought. There was not any other gun proven to have been owned by the accused.

The coincidence of figures, accompanied by some other circumstantial evidence, was of such strong character that the jury was convinced of his guilt. However, they were unwilling to inflict the extreme penalty of either death or life imprisonment.

The court's original and subsequent instructions prevented anything but either a first degree conviction or an acquittal. The jury found "not guilty" and were severely criticised.

An after-inspection of the two fatal bullets disclosed them as having been made by the Peters Cartridge Company and not by the Remington-Union Metallic Company. This clearly disposed of one important item of evidence in this particular case, and probably justified the verdict, even though the information was not available to the jury. Beyond doubt there has been many such cases in the past, but it is doubtful if there has been many with as fortunate an ending.

5. *Differentiating Between Bullets by Their Composition.* The attacked police officer killed one of the two gunmen before he passed out himself. The officer was using a Smith and Wesson special. The dead attacker had a 45 Colt in his hand when found. It contained both loaded cartridges and fired cases, all of which were of the well known REM-U. M. C. brand, and the loaded ones contained lead balls.

A second man was arrested and found armed with a 45 Smith and Wesson revolver adapted to the use of clips in connection with the regulation 45 calibre Colt automatic pistol cartridges, which carry the standard cupro-nickle jacketed bullets. In this revolver were both loaded and fired cartridges, all of which were the REM-U. M. C. brand.

The dead officer had been shot but once. The projectile taken from his body was badly battered and apparently was but a portion of its original size. It was much too light for the 45 Colt, and, being of lead alone, it was assumed that the 45 Smith and Wesson, shooting copper jacketed bullets, could not have fired it. To the investigators it looked to be of about the calibre of a 38, and much speculation

was had as to who was the third party engaged in the murder of the officer.

The outlaw under arrest could hardly be charged with the actual murder on account of his shooting metal jackets. He was therefore charged with "Shooting with intent to Kill."

The specialist on firearms who was consulted, discovered the lead bullet from the officer's body to be the lead core of one originally copper jacketed. This conclusion was based on the fact that one portion of this bullet which was unmarred showed quite smooth. To him this indicated a previous swedging of the lead against the inside of its copper coat. The lead of this bullet was of an apparent hardness in excess of that of the 45 Colt REM-U. M. C. lead bullet. In addition there was not a trace on any part of the fatal bullet where the riflings of the revolver barrel had registered.

From all these things the consultant was reasonably sure that this lead core had been dislodged from its copper jacket when hitting a bone and suggested that the body of the deceased officer be exhumed and X-Rayed, and the copper jacket be located and recovered to be used as an exhibit to substantiate his findings. He also suggested the making of a chemical test of the lead from the fatal bullet and one from the 45 Colt. He was aware of the fact that the REM-U. M. C. copper jacketed cores contained a ten per cent alloy of tin, while the 45 Colt lead bullets were made up without a hardener.

This was an Old Kentucky case. It is mentioned so that one may more readily understand why the relatives of the deceased officer did not respond to either suggestion. Had the suggestions been carried out, the murderer would have received a sentence of death or imprisonment for life; and in this state the machinery of the courts do not always furnish the desired satisfaction. The kinsmen did not want anything to either delay nor deter them in taking care of the murderer in their own particular way.

Comparatively few persons know as yet that such scientists as the late Judge Waite of New York, Major Goddard (his partner), Mr. Lucas, and possibly a few others, after gathering and comparing hundreds and hundreds of unmounted specimen bullets from all the manufacturers of the United States, Canada, England, Germany and other foreign countries, are now able to state, in many or most cases, that a certain projectile is of a certain make. To relate all the actual cases of recent date or to tell of the possibilities of these researches would make a book of considerable size. These few cases makes it unpleasant to reflect or to speculate on what might be discovered

by examinations of the fatal bullets and the guns involved in many past murders for which men and women are under sentence, have served sentences, or have been actually executed.

6. *Identifying the Guilty Gun.* Sergeant S, while attempting to arrest two armed negroes, was fatally shot. S had his revolver in his right hand at the time. One of the negroes had hold of the officer's hand and was endeavoring to get his revolver from him when it was discharged. At the same time, the second negro came up from the rear and to the right; this negro had his revolver in his right hand. The officer fell with a bullet wound in his right side. The negroes ran. They were pursued, and one of the pursuers was also shot. Both negroes were shortly afterwards captured. Each was found armed with a 32-20 Colt, one of the revolvers being an Army special model and the other a Police positive special. Each of the revolvers had six lands and six grooves; each had a left twist, and both had the same apparent rate of pitch to their riflings.

The officer made a statement before dying that he had shot himself, by accident and with his own gun, during the struggle. The large hole in his side seemed to support this statement as it was much too large to have been made by a 32-20 calibre bullet unless the muzzle had been held against the body. The calibre of the officer's revolver was a 38.

The autopsy produced a 32-20 bullet and a metal button from the officer's trousers band which had been hit and carried into the body. This had not been noticed earlier, but when found explained the large wound in his side.

The fatal bullet, the one that struck the pursuer, and the two revolvers of the negroes were submitted to the firearms specialist for examination; the officer's revolver was not submitted. He was able to identify the bullets as of a certain make. A microscopic examination of the barrels of the revolvers developed that one had not recently been fired. Firing test shots through each of the revolvers and recovering the bullets, he made a comparative test of each with the two questioned bullets. This examination was conducted through the use of a specially constructed stage or stand capable of six different movements on each of two sides. The microscope used was such a one as was designed by the celebrated "Examiner of Questioned Documents," Mr. Albert S. Osborn. The original purpose of this instrument was the comparison of colors. These tests enabled the witness to say with positiveness and to show with practically absolute cer-

tainty that the Army special had fired neither bullet, and that the Colt Police positive special had fired both of them.

This examiner never allows submitters of problems to tell him anything as to the other evidence known as to the case. He aims to form his conclusions from a study of the firearms and the projectiles alone. Until he went on the witness stand at the trial of this case, he had never seen the officer's revolver and did not know it played any part in the matter. When it was handed to him while on the stand, he informed the court that he had never examined it nor seen it before, and that an inspection of it was not necessary as it only had five lands and five grooves with a right twist, and that the questioned bullets had six lands and six grooves with a left twist.

This examiner also makes it a practice to remain out of the court room during the progress of a trial, so as to not know what other witnesses testify. For this reason, he did not know that the attorneys for the defense had predicated their case entirely on the strength of the officer's dying statement.

At the conclusion of the examiner's testimony, and without cross-examination, the attorneys for the defense advised the court that they were willing to admit the correctness of the witness's deductions. They at once changed their line of defense to that of establishing a justifiable homicide.

The actual user of the guilty revolver received the extreme penalty and was executed a few weeks ago. The jury also awarded the second negro fifteen years.

The evidence in this case was reviewed by the higher court and it sustained the verdict of death for one, but remanded the second negro for a new trial. This man was shortly afterwards released without the formality of a second hearing.

Then there was that rather amusing case where the burglar shot a man. When the accused was arrested on suspicion, five people were soon found to alibi him as being miles from the scene of the shooting at the time it occurred. When the accused was shown that it was his revolver that fired the bullet, he was immediately convinced and remarked, "*This sure has put my witnesses in a hole!*"

And that other case (not quite so amusing), where two eye witnesses stated one thing, but the angle of fire by an accidental discharge of that particular revolver, accompanied by the position of the accused and the powder marks on the clothing and the course of the bullet through the deceased, showed an entirely different thing.

Finger-print impressions were recognized as a sure means of personal identification some several thousand years ago. But the acceptance of such identifications by our courts has taken place within the last twenty years. It is safe to say that more than one failure to prove non-identity has resulted disastrously during that period of time.

Handwriting as a means of conveying money and property, as well as knowledge and sweet nothings, was devised centuries ago; for the last three hundred years it has not been confined to the well educated alone, in English-speaking countries. Within this interval between the age of ignorance and knowledge there have been, beyond doubt, countless forgeries. And last year a conservative estimate of the losses to the honest citizenship of this country through this crime alone ran into the millions of dollars. However, it has only been in recent years that the rules of evidence allowed either the juries or the technical witnesses to use the common sense method of comparing questioned signatures with known authentic signatures as an aid to seeing similarity or dissimilarity.

The use of firearms also dates back for some centuries. History records that Seville, in Spain "was defended in 1247 by a cannon throwing stones." Powder and ball have been used for commercial killings and domestic murders ever since. At the present time, killings have become so numerous in some of our larger cities, that one is almost justified in believing murder here and there can be classed as a business. But it is only within the last few years that ballistic evidence has advanced to the stage where it is of real value. In respect to this phase of jurisprudence, our courts have not proven slow, regardless of the law's record for tardiness in the past. The courts can even be said to assume a progressive attitude in the consideration of this new form of evidence. In none of the cases mentioned in this article was there a serious effort made by opposing counsel towards obstructing the introduction of competent evidence. The courts and the juries have been very patient. It has been nothing unusual for the courts and the individual members of the juries to ask pertinent questions. Some of these inquiries may have been motivated by a lack of belief, but the majority of them, it is thought, were simply for the purpose of bringing out all the facts. Fortunately for the witness in firearm problems in the vicinity where these foregoing cases were tried, the majority of the inhabitants own and use firearms and therefore have a direct knowledge of their own which makes a good framework on which to labor.