

BALLISTICS EVIDENCE

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THE term 'ballistics expert' occasionally appears in the newspapers under the Court Reports' column. This is admittedly a very imposing title; however it is hardly descriptive of the demands made of this study or of the person practising it. 'Forensic ballistic expert' would be nearer the mark, but I believe that in most countries now such court experts are referred to as the 'firearms identification witness'. For several years now I have been called upon to act in this capacity in cases before the courts where the use of firearms played an important part.

Basically, my duties are to examine all evidence relating to the firearm or firearms in question and to evaluate data, and furnish an opinion based on the established facts.

The witness's duties normally begin as soon as possible after an incident involving a firearm is reported to the Magistrate on duty. It is he who appoints and empowers the witness to be present at various stages during the Magisterial Inquiry and it is thus that the witness can inspect the scene of a crime and collect the necessary evidence before anything has been touched or moved. The importance of the witness being on the spot in the early stages cannot be stressed enough and it is surprising to note what valuable information can be collected from the location of evidence.

In one particular case where shots were fired at a showroom window, the cartridges were found about 25 yards away from the showroom. From their location it was possible to establish that the shots were fired from a moving car. The direction in which the car was travelling could also be deduced as well as on which side of the road the car was. That the shots were not fired by the driver but by the passenger was an important point that could be established. The actual cartridges themselves revealed several features including the type and general description of the weapon and the fact that the same weapon had been used in another crime on a previous occasion.

The evidence with which the witness is most concerned are the firearms, cartridges and bullets, the corpse or wounded person and the clothing he was wearing. These all help to build a picture and the absence of any one of these requires the witness to make some surmises that may not be correct, and then to rely more on his technical knowledge regarding specifications and ballistic data.

Basically, firearms fall under two categories: smooth bored and rifled arms. Both these types can be subdivided into a number of varieties; however it is sufficient in the present context to state that there are single shots, revolving, semi-automatic and fully automatic weapons. The last two eject the cartridge case every time they are fired. Naturally these weapons can be further subdivided into a number of calibres.

A smooth bore is a firearm in which the bore or the inside of the barrel is perfectly smooth from end to end and therefore leaves no identifying marks on the projectile. In rifled arms the bore is cut longitudinally with a number of grooves. The grooves are parallel one to the other but are cut with a twist or spiral from breech to muzzle. The grooves are actually termed grooves and those portions of the bore which are situated in between the grooves are known as 'lands'. It is these grooves and lands which impart to a fired bullet the marks with which the witness is concerned. They are the thumb print of the firearm on a bullet and are as infallible as a finger-print. It is a fact that no two firearms, even with consecutive serial numbers, could produce identical 'striations' on a bullet.

For a firearm to be of real value as evidence, the witness must also have the fired bullet. The bullet can be related to the firearm and also to the person or object fired at, whilst a cartridge case can only be related to the firearm that fired it. In other words, if only a cartridge case is produced as evidence, the accused may well claim that although that particular cartridge case was fired from his gun, it was not his bullet that inflicted the damage to a person or property.

When a bullet or cartridge as well as the firearm are produced for examination, the witness has the task of firing test shots from the very same firearm and compare the test shots under a comparison microscope with the one or more connected with the case. This is not necessary if the specifications of the crime bullet are other than those that could be fired by the weapon under examination. It is usual for the court to accept the witness's findings but should the defence counsel contest such evidence, it is possible

to furnish photographic documentation of the comparative data. It may be worth mentioning that it is not only the barrel of the firearm which imparts its thumb-print but other parts such as the breech face, the extractor, the ejector and the lips of the magazine, if the weapon is so provided.

Since smooth bore firearms usually fire lead shot, no thumb-print is imparted to them. However, the cartridge case can usually be identified as having been fired by the weapon in question. Since lead shot spreads as the distance from the firearm increases, it is also possible to establish the distance at which a shot was fired more easily from a smooth bore than from a rifled arm. The contents of a smooth bore cartridge also help to facilitate the interpretation in this respect.

The witness must be prepared to give evidence regarding the serviceability of the firearm and he has to establish whether the firearm is liable to discharge accidentally. It is sound and safe practice to test every firearm for this possibility at the very beginning of the examination. In accidental discharge, more often than not, the weapon is found to be faulty and on occasions the gun is found to fire as it is being shut or with the slightest knock. In other cases a gun may fire at the slightest touch of the trigger, or the safety catch may be found to be ineffective.

The witness is required merely to state the results of his examinations and express his opinion on such facts. As any other expert witness he is entirely unconcerned with the guilt or innocence of the accused. The prosecutor may be pleased to hear that there was only a remote chance of the firearm discharging as it fell from the accused's hands but the defence counsel may overplay the fact that this was in fact a remote chance. As a rule, it is advisable for the witness to offer his opinion on the exact condition of the firearm quoting precise data for pressures, etc. and comparing these with the makers' specifications book regarding the firearm and ammunition.

When an accused is charged with attempted homicide in cases involving firearms' injuries, especially when a shotgun is the weapon in question, the witness is frequently asked whether that particular weapon was capable of causing death at a particular distance. The answer to this question is not the competence of the firearms expert, and should be left to the medical witness. I recall one particular case when the charge was attempted homicide and the weapon used was a shotgun. The writer was asked to give his opinion as to the possibility of the firearm causing death

at a distance of twenty-five yards. The witness felt that he was not competent to give a satisfactory answer and the medical witness was recalled. Medical evidence then quoted an example of a victim who was killed by one pellet from a shotgun fired at twenty-five yards. The pellet had penetrated the jugular vein, which is just beneath the skin of the neck, and the victim died of severe bleeding.

In fatal cases, it is commendable that the firearms identification witness is present in the post-mortem room during the dissection. His presence there is very important to him and he helps considerably in many ways by collecting first hand information, and providing expert advice on the spot. In turn, the free exchanges with the pathologists can only be of mutual assistance and contribute substantially towards the formulation of unimpeachable scientific opinion. The evidence acquired here usually includes the direction of the shot, the distance at which the shot was fired, and various other useful information which varies from case to case. The writer recalls one particular incident when a young girl was accidentally shot with a shotgun by her equally young brother. The boy had picked up his father's shotgun after the father had returned from a morning's shooting, and fired the gun in his sister's direction believing it was unloaded. At the post-mortem examination a piece of wood was recovered from the child's wound. The witness had tested the gun with the same type of ammunition used in the incident and noted that the cartridges were extremely difficult both to insert and to extract from the gun chambers when the gun was not fired. The witness was therefore able to express the view that in all probability the father had made an effort to extract the loaded cartridges using a piece of wood and that this had probably broken inside the barrel. The remains of that same piece of wood used had been found in the wound at the post-mortem.

In the post-mortem room the witness and the medical team can also establish whether any powder marks exist on the corpse or on the clothing. If a firearm is discharged at very close range, the range varying with the type of weapon and ammunition, powder burns are liable to occur. As the range increases slightly only powder marks may instead be evident. As the range increases further there would be no evidence of either burns or powder marks. Powder marks could also leave superficial and small injuries to the skin (tattooing) which cannot be washed off, but occasionally it is only powder deposits that are left on the skin and clothing

that may be evident to the naked eye but may be washed off quite easily. In other words, the eventuality could arise where powder marks could have been evident on a corpse or his clothing but were washed off after a heavy downpour of rain. The witness is often confronted with the question of the range of shot from the gun to the victim and unless either powder burns or marks, in the case of rifled arms, exist, it is extremely difficult to establish this fact. The size of a wound resulting from a smooth bore weapon usually makes this possible since the size of the wound bears a relation to the distance.

In this short account, I have attempted to impart some basic technical knowledge without going into detail. A more elaborate approach would otherwise prejudice the aim of the presentation.

In conclusion, it ought to be said that, not unlike other expert forensic evidence, evidence relating to firearms follows a set of general rules. Starting with the careful collection of material, systematic examination is essential. The data are closely examined, and it is only then that a firm opinion can be expressed. It is this opinion clearly expressed that is of primary importance, and is what is awaited. It will be accepted if it is conveyed with honest conviction, without bias. If rejected, the satisfaction of having performed one's duty with labour and dedication outweighs the exhilaration of having got one's way.