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DETERMINATION OF FIRING DISTANCE IN CASES INVOLVING SHOOTING THROUGH GLASS

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Cases involving shooting through glass occur quite frequently. One of the important problems that demands solution in such cases is the estimation of range of firing. The conventional method for estimation is based on the study of the powder pattern and as such it is unsuitable for determining distances beyond the powder range. In fact distances beyond the powder range cannot be estimated except in cases where shotguns are involved. Even the powder pattern, originally present due to close range firing, may disappear due to rain or some other unusual condition prevailing at the scene of crime. In all such cases the need of an alternative method for the estimation of range is definitely felt. With this in view the present investigation was undertaken.

It is well known that whenever a sheet of glass is broken by bullet impact, although most of the broken glass pieces travel in the direction of the impact, many fine chips are thrown backwards towards the shooter. This is due to the breaking of the glass on the side of the impact. These fine chips are thrown with considerable force, and they bombard the shooter thereby becoming embedded into his clothing. The shooter is usually not aware of their presence unless they strike the skin and make a cut. Although a number of cases have been reported where the identity of the fine chips of glass recovered from the shooter's clothing has been established with the original glass sheet by well known methods for determination of density and refractive index, thereby providing a link in the chain of evidence, the author is not aware of any effort to utilize the phenomena of backward chipping for the estimation of range.

The fact that these chips are very small forbids them from covering large distances, and as such the presence of glass chips on the body of the shooter points out the fact that the muzzle of the gun was held within a couple of feet. If, therefore, the maximum distance upto which these chips can be projected is determined by experimental firing, the distance of firing was obviously within this distance. Thus, even if the powder pattern, originally present, is washed out by rain, the presence of the fine chips of glass can provide an estimate of the range.

There may be instances when the powder pattern may be absent due to greater range but the glass chips may still be present on the clothing of the shooter. In such cases if the maximum distance upto which the powder pattern is observed is determined experimentally, then this will provide a lower limit to the range of firing. This lower limit together with the maximum distance of projection of glass chips (upper limit) will determine the range of firing with reasonable degree of accuracy.

It is, however, necessary that while experimenting, the same firearm and similar ammunition be employed as suspected to have been used in the crime. Further experiments should be carried out on glass similar to one involved in crime, and it should be held in a similar way.

Experiments carried in this laboratory on ordinary glass plates $\frac{1}{16}$ inch thick and fired upon by .22 rifle chambered for .22 long rifle cartridge revealed that a few chips could be projected as far as six feet and large number of chips were found at a distance of two feet. Thus it is clear that glass chips can be projected backwards to distances well beyond the powder range.

It can be seen from above that the phenomena of backward chipping can be utilized to estimate the range of firing if the identity of the small chips of glass recovered from the clothing of the suspect can be established with the original glass sheet.

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