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PELLET IDENTIFICATION

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Identification of pellets fired through smooth bore firearms is not known and is looked upon as insoluble problem. But the importance of pellet identification can not be overemphasised, especially in our country where the use of smooth bore firearm is encountered very frequently in crimes.

It has been observed that pellets, especially of larger sizes such as L.G. and S.G., often carry identifiable markings. These are scratched by the surface irregularities of the barrels. The pellets carrying these markings can be identified provided such markings can be produced on test specimens. However, statistical probabilities are very small that other shots fired through the same barrel would touch exactly identical points every time. Due to the difficulties in obtaining desired test specimens, the identification of fired pellets remained impracticable. Identification of such pellets should be possible if the markings from the requisite points area could be reproduced. A successful attempt has been made to obtain such test specimens, with special reference to smooth bore country made pistols (short barreled) chambered for 12 bore cartridges.

THEORY

It is well known that barrels are not perfectly smooth and their surfaces are irregular, having rough spots of elevations and depressions. The striations on the pellets are produced by their passage over these surface irregularities and they are highly characteristic for individualisation. The pellets may be scratched only by a small portion of the barrel. Normally only one side of the pellets is found to have striations which are due to the scratching by one segment of the barrel. These markings from the required surface can be ensured if the striations due to the entire surface of the barrel are obtained.

A projectile may carry striations due to the entire surface irregularities if it perfectly seals the bore. Perfect sealing of the bore can very well be achieved by using projectile of greater diameter than that of the bore. But shotgun cartridges are not loaded with any single projectile having diameter greater than the respective bore diameter. Amongst the available single shotgun projectiles, single balls can alone be considered to serve the purpose. But single ball diameter is always less than the minimum permissible diameter of the bore of the gun. Therefore, single balls of larger diameter can only be used for test firing. It is not possible however to do this because of limitations of chamber size and possibility of bursting of the barrel. Single balls of slightly greater diameter can, however, be pushed through the barrel so as to take on the necessary bore markings for comparison. But a single ball being spherical has another disadvantage of minimum surface contact and is also not commercially available in different sizes according to the requirement. Considering the above factors, the best suited test specimen should be cylindrical in shape and be made from lead, which being soft can be pushed through the barrel with ease. It is, therefore, clear from the aforesaid discussion that, for comparison, test specimen of lead, cylindrical in shape and slightly greater than bore diameter, should be pushed through the barrel. This test specimen will necessarily touch the entire inside surface of the barrel and will also bear markings from the set of points of particular interest.

EXPERIMENTATION

Cylindrical lead specimen (pellet) of any desired dimension can very easily be made by casting. An improvised method has been devised and adopted in the laboratory for preparing such test specimens. A flexible steel strip of $\frac{3}{4}''$ width has been used which could be turned to form a cylinder of

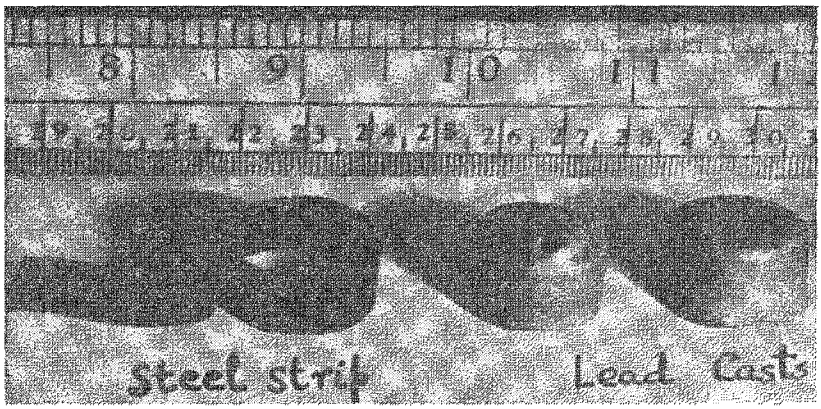

FIGURE 1

any desired diameter. The steel strip and the cylindrical lead specimens cast in it are shown in figure 1.

Experimental firings were conducted through a country made pistol chambered for 12 bore cartridges, using a 12 bore cartridge loaded with L.G. shots. The fired shots were recovered. Out of the six fired pellets, two pellets were found to have sufficient striations for comparison. As discussed earlier, test specimens were prepared by casting lead pellets of slightly higher diameter than that of the bore. Two such test specimens were pushed through the barrel of the country made pistol. These test pellets were examined for bore markings and as expected, were found to match throughout the surface. Thereafter, one of the recovered fired pellets and the test specimen were compared for characteristic bore markings. On thorough examination, positive match was observed, proving thereby that the striations which matched on the test specimen and on the recovered fired pellet, were due to the same source. Figure 2 shows a positive match between the test and recovered fired pellet.

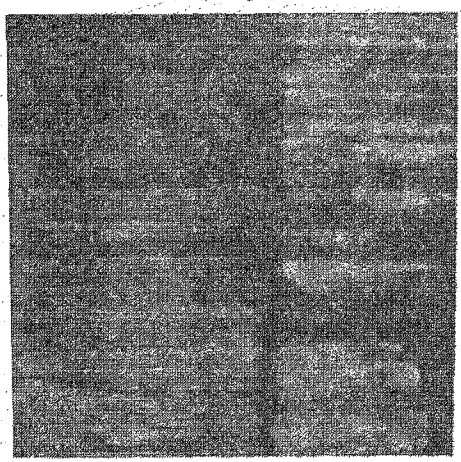

FIGURE 2

Test Crime

To study the reproducibility, another test specimen was pushed through the barrel and the markings thereon compared with those on the fired pellet. Both the test and the fired pellets did match at corresponding position as in figure 2. Moreover, the tests among themselves had positive match at similar position.

The other recovered pellet having sufficient striations, when compared with the tests was also found to have positive match. However, the position of matching was entirely different from the previous one. In the murder case in which the said pistol was used, a L.G. fired shot, which had been recovered from the body of the deceased, was also positively linked. Figure 3 shows the striation-matching of the questioned fired pellet with the test specimen.

In order to study elimination and individuality, five country made pistols chambered for 12 bore cartridges were taken for experimental purposes. One cartridge, each loaded with L.G. shots, was fired through each of them and the fired pellets were recovered. Five fired pellets, one from each group having sufficient striations were secretly marked and mixed. The test specimens through all the pistols were obtained and compared with the

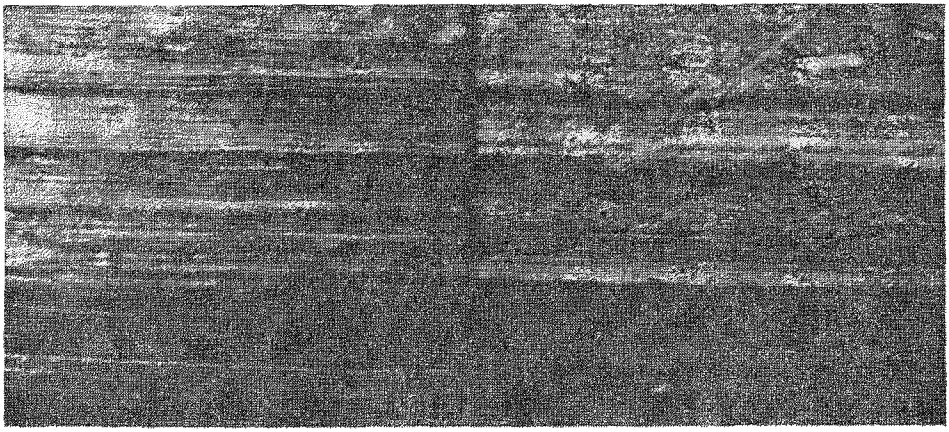

FIGURE 3

Test Fired Pellet

recovered fired pellets. After careful examination, it was possible to link each pellet with the appropriate weapon.

Examination of number of fired pellets revealed that while many of the fired pellets had identifiable markings, many others had several additional markings which could be due to partial rotation of the pellets inside the barrel. Further investigation in this regard is being carried out.

Possibility of identifying pellets fired through long barrelled shot guns were investigated. It was observed that, although there is difficulty to some extent in obtaining test specimens as compared to short barrels, identification could be achieved satisfactorily.

SUMMARY

The possibility of identifying pellets fired through smooth bore firearms has been investigated with special reference to locally made smooth bore pistols chambered for 12 bore cartridges. It has been found that fired pellets having identifiable markings can be identified. However, for comparison, instead of firing test cartridges, test specimens are obtained by pushing slightly oversized cylindrical lead pieces through the barrel.

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