RANGE OF FIRING

It is a very imp. problem it helps in deciding about homicide or self infliction of holes. In case the range of firing can be proved to be more than the length of arm of deceased, the theory of suicide & or struggle can be disproved.

The ejecta coming behind a bullet or the dispersion of pellets forms the basis of range estimation. When the firearm is discharged and after the bullet has left the muzzle, some other ingredients like hot gases, smoke, unburnt and partially burnt propellant grains, small metallic chips also comes out. The different constituents of this ejecta travel to diff. distances and the effects produced by them form the basis of range estimation.

(i) BURNING - When the bullet is left the gases coming out behind the bullet are at a very high temp and consist of $CO + H_2$ mixture. When this mixture comes in combines with the O_2 of atmosphere at a very high temp. a flame is produced. This flame extends upto a few inches and within its reach can produce burning, scorching or

charring around the gun shot hole. This area burns and looks black. BURNING OF THE TISSUES CAUSES DRYING AND STIFFENING OF THE MARGINS of THE WOUND. Singing of the hair will be noted.

In long barrel firearms burning may be seen about 6 inches and in case of short barrel it can be observed about only 2 - 3 inches.

(ii) BLACKENING - The propellant gases and the smoke consisting of carbon particles deposit around the wound and produce blackening. The blackening and burning can be distinguished by the fact that blackening can be easily wiped out/off whereas burning can not be. More blackening is observed when if black powder is used as propellant. With smokeless powder less smoke is produced and consequently the blackening is also less. With long barrel firearms blackening can occur upto a distance of about 12 inches whereas in case of short barrel firearm blackening can occur upto about 6-8 inches only.

(iii) TATOOING - Partially burnt and unburnt propellant particles travel and invade around the gun-shot hole. If the entry wound is on skin not covered by clothing then this particles may produce

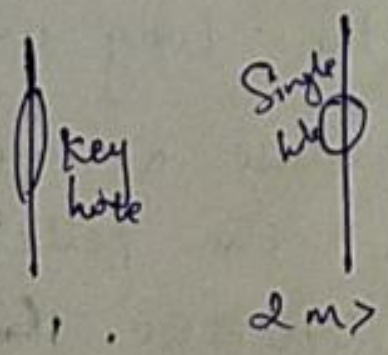
small contusions. In case of long barrel firearms tatooing may be observed upto a dist. of 5 feet whereas in case of short barrel firearm it goes about 1-2 feet. Photography under infrared light reveals the pattern of tatooing. The other widely used method to reveal the pattern of tatooing is detection of nitrite through photographic paper.

PRESENCE OF ELEMENTS - When the bullet passes through the barrel small chips of bullet material may be scraped as a result of friction b/w the bullet and the bore. These metal chips may sometimes cause contusions around the wound. By suitable chemical tests the pattern of lead / copper particles around the bullet hole can be obtained on a filter paper.

The presence of elements like lead, barium, antimony, mercury etc are also imp. which comes out from the primering mixture. It is believed that their vapours travel behind the bullet when the bullet passes through a target they deposit around the bullet hole

(v) DISPERSION OF PELLETS - In case of very distant shots we see only a bullet hole and it is not possible to estimate the range. But in case of firing shotgun cartridge loaded with several shots it is possible to determine the range upto a fairly long distance based on the spreading pattern of the shots.

DATA :-
In case of regular 12 bore firearm with cylindrical barrel (no choke) the shot charge makes a single hole upto a dist. of 2m. At an after 2 meter the individual pellets just start separating from the main charge this is called COOKIE CUTTER etching. At a dist. of upto 5meter a rat hole is produced i.e a central hole surrounded by several holes caused by the penetration of individual pellets of group of pellets.



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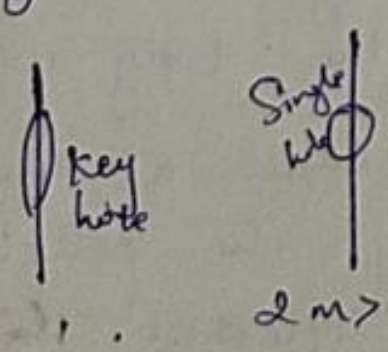

2m > 2m upto 5m

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NOTE :- RANGE IN CASE OF MUZZLE LODING FIREARMS

- In this case, it is not possible to determine the range of firing it is difficult to acertain as to what amount of propellant & projectiles were loaded.

- In case of more then 1 at hole
Take a cloth and through same calibre shot the pellets in diff. range (7m, 9m, 11m).
This phenomenon is known as Billiard's ball Richochet
~~Rachiochet's~~ < intermediate target deflection from origin path } 30 m is rough estimate
~~The~~

The pattern of spread of pellets as obtained in x-ray of body should not be taken for range estimation. It has been found in some case that even if there was only 1 entrance wound made by all the pellets, their dispersion inside the body was very much wide. This is so because at the time of entering into the body the pellets strike one another and get deflected. This is known as Billiard ball radio richochet phenomenon. Thus we get a widespread pattern of pellets in the body.