

THE GUN.

The object of rifling a gun is to (a) increase its accuracy, (b) to enable an elongated projectile to be used.

As the rifling gives a definite rotation to a projectile its lateral deviation is constant and can be allowed for, thus increasing the accuracy of the gun.

The advantages of an elongated projectile are: 1. Less resistance of air, because of smaller head for same weight. 2. Flatter trajectory. 3. Head may be of any form or weight. 4. By varying the length different projectiles may be made of the same weight. 5. Double shell may be used, which are specially heavy. 6. Capacity of shell is increased. 7. A shell of the same weight as that of the S. B. gun can be fired from a much lighter gun, or a heavier shell from a gun of the same weight.

The systems of rifling now in the service are:—

(a). The R. B. L. Polygroove (original Armstrong). Rotation given by soft metal coating being forced into a large number of grooves with sharp corners. Ex.: 40pr. R. B. L. gun.

(b). The R. M. L. old Woolwich system, having a few broad deep grooves. Rotation imparted by means of soft metal studs fitted to correspond with the grooves, or in studless projectiles, by gas checks, which take the rifling. Ex.: 64pr. R. M. L. gun.

(c). The R. M. L. and B. L. modern Polygroove. Rotation given in the former by gas checks, in the latter by driving bands which are forced into a large number of shallow and rounded grooves. Ex.: All modern R. M. L. and B. L. guns.

THE PROJECTILE.

The forces acting on a projectile in the bore of a gun are: (a) the force of projection of the powder-gas, (b) the rotation imparted to the projectile by the grooves.

The forces acting on a projectile during flight are: (a) the force of projection, (b) the force of gravity, (c) the resistance of the air, (d) the rotation due to rifling.

The variable forces acting on a projectile are: (a) varying effect of the charge because of incorrect weighing, variation of strength of powder, resistance of the air, or difference of space occupied by cartridge in the bore, (b) difference of level of trunnions, (c) force and direction of wind.

USE OF PROJECTILE.

Common shell are used to destroy the *personnel* and *materiel* of the enemy, by bursting them close up to the