

6. In order to ensure this, attention must be given to every man. Officers and non-commissioned officers must not rest content with a general survey of a squad at drill, but must satisfy themselves that every man is an efficient gunner, having his limited and practical duties at his fingers' ends. No man who has not been so examined and passed should be considered fit to go to practice.

7. The men trained as range takers, layers, and observers, must be constantly and thoroughly practised, and every opportunity should be used to test their efficiency.

8. If some thought is given beforehand to what is actually required at practice, and it is ascertained that all ranks know their duties, the battery will be in a position to profit fully by the actual practice, and to carry it out without hesitation or delay.

ELEMENTARY PRACTICE.

12. The objects of elementary practice are—

- (1.) To show the results of the faulty handling of guns or ammunition, and
- (2.) The normal errors of the gun and fuses.
- (3.) To teach observation of fire under conditions of complete deliberation.
- (4.) To instruct in the various methods of picking up and verifying ranges.
- (5.) To allow of observation of the action and effect of the various projectiles, noting them from a point as near the target as is compatible with safety, and
- (6.) To instruct in laying by auxiliary mark.

13. Amongst common errors and causes of bad shooting are these :

- (a.) Rough laying, and laying successive rounds upon a different point of the target, or off it altogether.
- (b.) Not using a full sight, or varying the distance of the eye from the sight.
- (c.) Making the last turns of the screw upon elevation instead of depression.
- (d.) When firing trial shots, creeping up to or back to the target by small alterations of elevation. At distant and quite unknown ranges, even 400 yards alteration between first and second shots may not be too much.
- (e.) Commencing shrapnel fire with time fuzes, without having previously determined the elevation by a fire of common shell with P. fuze.
- (f.) Holding to the range table when the shooting is clearly incorrect.
- (g.) Assuming a blind fuze to be due to faulty manufacture instead of (as it generally is) to its being bored too long.
- (h.) Alterations of elevation or fuze by single rounds, instead of taking the mean of a group.
- (i.) Faulty observation of the effect of fire.
- (j.) Bad ramming home.
- (k.) Defective ammunition.

RANGING A BATTERY.

Ranging a battery consists of three processes, viz. :—

- (a.) The finding of the long "bracket."
- (b.) The finding of the short "bracket."
- (c.) Verifying the range.

A bracket consists of distance between two shells, one under and one over the object.

The length of the long bracket should be about 10 per cent. of the range, the short not over 50 yards.

I.—*The process as at present in use is as follows :*

- (a.) To find the long "bracket"—

The guns are laid at the elevation proper for the range as found, or estimated ; No. 1 gun is fired ; according as the shell is short or over, No. 2 gun receives 100 yards to 300 yards (depending on the range) more or less elevation, with the object of making certain that the shell shall fall on the opposite side of the target to that on which the first shell fell.

When the target has been included between two shells, the long "bracket" is found. In this case suppose them to have 2,100 yards short, and 2,300 yards over.

- (b.) To find the short "bracket"—

A gun, say No. 3, is fired with the elevation corresponding to the mean of the two ranges which make up the long bracket—viz., 2,200 yards.

This is marked short.

No. 4 gun will then be fired with elevation due to 2,250 yards, being the mean between 2,300, which was marked over, and 2,200, which was short.

If this be over, the correct range is bracketed between 2,200 and 2,250, and the short "bracket" is found.

If the first round had been over, the round following would have been fired at 2,150, being the mean of 2,200 marked over, and 2,100 marked short.

(c.) Verifying the range—

This is absolutely necessary, as one or both of the shells, which form the "bracket," may have been at one extreme of the probable rectangle, and, therefore, not trustworthy.

It is carried out by firing 4 to 8 shell at the mean of the short "bracket," in this case at 2,225 yards.

If, on careful observation, it be found that the proper proportion of shell are over and short, this may be taken as the range; if not, 25 yards may be added or subtracted. If this does not correct the error, it is probably due to faulty observation, and the short "bracket" must be found again.

When firing at objects which have little height, such as infantry lying down, shelter trenches, etc., one-half of the shell should be over, and one-half short; when the target has height, from two-thirds to three-quarters should be over, and the remainder under.

27. II.—*The bracket process :—*

- (a.) The officer commanding the battery gives "2,300 yards, bracket 200."

The centre division lays at 2,300, the right at 2,500, the left at 2,100.

The centre division fires; the shell is marked short. Commanding officer gives "right division," which takes up the fire at once; left division, without further orders, increases elevation to 2,700.

And so on until the long "bracket" is found, say 2,500 and 2,700 yards.

N.B.—With a view to economize ammunition, this fire may be by guns instead of by divisions, but the commanding officer having stated which he wishes, will give the same word of command in each case, leaving it to the section officers to name the particular gun.

An apparent hit must be received with mistrust, and either repeated or the elevation still increased or decreased in order to make sure of both ends of the bracket. The only exception to this rule is in the case where the range is so short that the actual damage done by the shell can be seen; in that case the battery will pass on to verify the range at that elevation.

- (b.) The "bracket" will, in a similar manner, be reduced to 50 yards.

- (c.) This will be the same as in the previous process.

It is believed that this system will be found quicker than the other, but it is liable to abuse by "creeping up."

PRACTICE AT MOVING TARGETS.

I.—*The German method :*

29. The target, presuming it is advancing, is included in a "bracket" to from 200 to 400 yards, according to its pace; a slow fire is opened with the short range of the bracket.

As soon as a shell is seen to be "not short," a rapid fire from a flank is opened with all the guns, and continued until three consecutive rounds have been marked over.

The range is then reduced by from 200 to 400 yards, and the same process repeated.

When cavalry have advanced to within 1,000 yards before the last rapid fire, the guns are loaded with case at once, as it is considered that there will not be time for another round of shell.

This method may be used against a target which is at a distance, and is moving slowly, as it may, in that case, be impossible to change from percussion to time fuzes.

II.—*Proposed method :—*

30. One section, that to leeward, is told off as the range-finder; this loads only with common shell with percussion fuzes

One round is fired at an elevation estimated to be well short of the target. If this falls about 300 yards short in the case of cavalry, 150 yards of infantry, it is accepted; if it is over the next is reduced; if it is far under the next is slightly increased.

The remaining divisions load with shrapnel with time fuzes, with fuse and range 50 yards shorter than the range thus found, and the proper elevation for that range is given to the guns.

A slow fire is kept up by the range-finding section, until one round is observed to burst close up; the two other sections then fire a salvo.