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G.S. Publications

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*Notified in
A.C.Is.
17th June,
1942*



Small Arms Training
Volume I, Pamphlet No. 2
Application of Fire
1942

(This Pamphlet supersedes the 1937 edition and that reprinted with Amendments (No. 1), 1939)

By Command of the Army Council,

A handwritten signature in dark ink, appearing to read 'L. Dornoch'.

THE WAR OFFICE,
17th June, 1942.

(Reprinted in Canada (August 1942) by permission of the Controller
HIS MAJESTY'S STATIONERY OFFICE.)

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GENERAL

1. *Object.*—The sole object of weapon training is to teach all ranks the most efficient way of handling their weapons in order to kill the enemy. Instructors will always bear this fact in mind and will continually impress it upon those whom they instruct.

2. *Requirements for Effective Fire* :—

- i. Fire unit commanders must have the tactical knowledge to select the targets and the best moment for opening fire. They must be able to indicate targets clearly.
- ii. Those under their command should be able to recognize the targets.
- iii. All ranks must be trained to judge distance.
- iv. Good fire discipline must be combined with intelligent fire control.
- v. Accurate shooting.

3. *The control of the fire power of the section.*—The section commander is responsible for the fire control of the section. Fire may be concentrated or distributed according to the type of the target. The value of holding fire in order to obtain the maximum of surprise as well as to ensure killing the enemy must be emphasized in all fire control lessons.

The light machine gun is the principal fire producing weapon of the section. The rifle is not only the personal weapon of the rifleman for use in an emergency or for augmenting the fire of the light machine gun, but it enables the rifleman by accurate shooting to "snipe" individual enemy. The section commander normally carries the machine carbine but may nominate another man. The machine carbine is not a light machine gun.

- i. *Collective fire* is the term used to denote the fire of the section under control of its commander. The method of firing the light machine gun is by single rounds or bursts, but owing to the heavy expenditure of ammunition that continuous automatic fire will entail, and since the amount carried is limited, single round firing will be used unless the target calls for volume.
- ii. *Individual fire* may be allowed on the orders of the section commander when on account of battle conditions the best advantage can be obtained by each individual firing on his own.

4. *Other aspects of the use of fire.*—Fire has more purposes than to kill the enemy. With ingenuity it can be used to obtain information or for signalling.

It is frequently difficult to spot the location of enemy weapons. The judicious opening fire by one of our L.M.Gs. or mortars will often serve to draw fire from, and thereby disclose, enemy weapons.

5. *Realism in training instruction for trained soldiers.*—

- i. Whenever possible fatigue men should be used instead of figure targets.
- ii. Whenever possible, live ammunition and not blank should be used. Bullets should pass as near as reasonable safety permits to those under instruction.

6. *Recruit instruction.*—Although in battle the requirements set forth in para. 2, above are interdependent, in the early stages of training each subject will be taught separately. The lessons in this pamphlet should be given on rough ground, but in exceptional circumstances landscape targets may be used, except for judging distance.

7. *Trained soldier instruction.*—The trained soldier must be especially exercised in locating indistinct enemy targets and in judging distance. He must continually be practised in applying his fire accurately when targets are indicated to him by a section commander. He should also be taught the theory of small arms fire (chapter 2, S.A.T. Vol. 1. Pamphlet 1) in order that he can take an intelligent interest in fire control. Finally, the trained soldier will get the maximum benefit from training in fire control through simple field firing schemes or through the use of harmonized sights on the 30 yards or miniature ranges.

8. *Method of fire with L.M.G.*—The gunner will invariably fire single rounds unless the fire order includes the word "bursts". The reasons for this are:—

- i. It saves ammunition.
- ii. There is less chance of the L.M.G. being spotted.
- iii. Fire tends to be more accurate than when bursts are fired.

9. Personnel equipped with field glasses must be exercised in their use. The importance of this form of training cannot be over-emphasized.

10. *Military vocabulary.*—A specimen vocabulary is appended as a guide to instructors. This should be taught, as occasions arise, in the various lessons. It should be amplified by teaching local names of features that are peculiar to the country in which the soldier is serving.

i. *Artificial features*

Track.	Post and rail	} fences	Viaduct.
Ride.	Hurdle		Culvert.
Sunken roads.	Pylon.		Cutting.
Ford.	Ricks.		Embankment.
Gable-end.	Stooks.		Lock.

ii. *Natural features*

Fir	} trees.	Hedgerow.
Poplar		Copse.
Bushy-topped		Gorse.

iii. *Topographical*

Ridge	Crest-line	Saddle.
Valley.	Horizon.	Forward slopes.
Fold.	Spur.	Reverse "
Defile.	Knoll.	Concave "
		Convex "
	Foreground.	
	Middle distance.	
	Background.	
	Dead ground.	
	Cliff.	
	Gorge.	
	Ravine.	
	Clearing.	
	Salient.	

iv. *Field engineering*

Slit trench.	Observation post.
Breastwork.	Emplacements.
Defended locality.	

v. *Types of fire*

Direct.	Flanking.
Indirect.	Enfilade.
Frontal.	Overhead.

CHAPTER I.—VISUAL TRAINING

LESSON 1.—SEARCHING GROUND AND LOCATING ENEMY

Instructor's Notes.

Stores : Figure targets Nos. 2, 3, 4A, and 5 ; fatiguemen armed with rifles, blank S.A.A. ; signal flag.

Personnel equipped with field glasses should be trained in their use in this lesson.

This lesson requires careful preparation and rehearsal shortly before it is due to take place. Otherwise a sudden change of light may well spoil the lesson. It will be carried out in two phases : firstly, with figure targets ; secondly with fatiguemen.

Select an area with well-defined boundaries, and put out the targets in the foreground, middle distance, and background. They should be so placed, having due regard to colour of target and its background, that some are easy and others difficult to locate. Light and shade must also be carefully noted.

When searching ground, even in the early stages, instructors must make students adopt proper positions of observation.

1. *Object.*—The object of this lesson is to teach how to search ground and to locate enemy.

2. *Arcs of fire :—*

i. Explain that arcs of fire are allotted to sections. The area of ground within the limits of the arc is the responsibility of the section, and they will engage all targets appearing within those limits.

The general line of direction and the arc of fire will be pointed out. They will be described by indicating landmarks, the fewer the better, starting on the right background and finishing in the foreground. Repeat for left of arc.

ii. Explain how to divide the area into foreground, middle distance, and background, or right and left sector. These divisions are made only if necessary.

3. *Searching ground.*—The method is to examine the ground systematically along imaginary lines from right to left, through foreground, middle distance, and background. The eye should travel along one line and return by the next, to ensure that no part of the area is omitted.

4. *Locating targets :—*

i. Instructor describes arc to be searched.

ii. Practise squad in searching foreground. After a given time men are selected to describe the targets they have found. The instructor will then criticize the description and explain the reasons why some targets were more difficult to locate than others, because of the variation in colour between targets and their background.

iii. Repeat the procedure for middle distance and background.

5. *Fatiguemen.*—This phase is carried out as above. The fatiguemen should be placed in firing positions in the open, and behind cover. These men will move and fire on flag signals. Emphasize how movement catches the eye and the noise of firing assists in locating the position of the enemy.

Note.—In later stages of training, N.C.Os. and men should be split into two halves—one half to do section handling. This party should advance against the remainder, who are occupying a platoon defended locality. Thus the latter are practised in observation and the former in section handling. Live ammunition should be introduced if practicable.

CHAPTER II.—JUDGING DISTANCE

1. *Object.*—To teach the soldier to estimate the range to the enemy correctly, thereby ensuring that, if his shooting is accurate, he will kill the enemy without wasting ammunition.

2. *Means.*—There are three means of obtaining ranges :—

i. *Judging distance.*—The estimation of range by the eye, which is the most common means ; all ranks will receive training in it. Skill is acquired by constant practice under varying conditions of ground, light, and background. The local conditions of light and background must be studied and advantage taken of every opportunity to practise, in order to maintain a high standard. Whenever possible, the range estimated by the eye should be checked by ranges taken by a rangefinder.

ii. *Range-finders.*

iii. *Large-scale maps.*

This section deals only with the training in the methods of judging distance.

3. *Observation of fire.*—It is the duty of the section commander to observe the fire of his section in order that he can correct its application if necessary. The possibilities of observing fire will depend on the nature of the ground surrounding the target. Should the fall of bullets be observed both short of and beyond the target, it may be assumed that the target is coming under the fire of the section. Observation of fire must be applied at all times.

4. *Ranging.*—Should the situation permit, ranges to objects within arcs of fire may be accurately checked by fire, provided that the neighbouring ground allows of the strike of the bullets being observed.

5. *Limits of training.*—All ranks will be trained to judge distances up to 1,000 yards.

6. All ranks will be trained to judge distance from behind cover.

LESSON 2.—UNIT OF MEASURE

Instructor's notes

Stores.—Four flags placed in position 100 yards from a central point in different directions. Flags will be so placed that the recruit has to look uphill and downhill, across open ground, etc.

Signal flag. 100-yard measuring tape. Small flags.

Fatiguemen.

Distances will be accurately measured in preparing this lesson.

To emphasize the unit of measure, each 100 yards between the squad and the object flag will be marked by small flags previously laid on the ground and invisible to those under instruction. The soldier having estimated the distance, will be questioned on how he has fitted in the number of "units" The small flags will then be put up and the difficulty of fitting in "units" as the distance increases pointed out. Emphasize the following limitations:—

The method cannot be employed for distances beyond 400 yards or when the ground between the observer and the object to be judged on is not visible.

1. *Explain:—*

- i. The main points of Chapter II, paras. 1 and 2, i.
- ii. The unit of measure. A method of measuring distance in terms of some familiar unit, i.e. 100 yards.

2. Direct squad to look at the flags in position, kneeling and lying, and memorize the distance of 100 yards.

3. Order men to place themselves independently at what they judge to be 100 yards from a named object. Pace or measure 100 yards from it, and show men the correct distance and the amount of their error.

4. Practise squad in judging distance to objects up to 400 yards from their position.

LESSON 3.—THE APPEARANCE METHOD

Stores.—Signal flag.

This lesson can, with advantage, be carried out on a classification range, using the firing point distances. If this arrangement is not possible, distances to be judged must be measured accurately.

Six fatiguemen with rifles are required, and must be rehearsed.

1. Explain that the detailed appearance of men in different service positions, and of objects of known size, will be studied and noted at various distances, and under varying conditions of light and background. This method of judging distance is both simple and quick, being best suited to service conditions.

2. Signal fatiguemen to appear in turn at distances from 200 to 600 yards, lying, kneeling, and standing at each distance.

Order men to observe the appearance of fatiguemen at the various distances and in the various positions, and show by demonstration of the fatiguemen the following guide:—

At 200 yards—all parts of body distinctly seen.

At 300 yards—outline of face becomes blurred.

At 400 yards—outline of body remains, but face cannot be seen except in favourable circumstances.

At 500 yards—body appears to taper slightly from the shoulders. Movements of limbs are still discernible.

At 600 yards—head appears as a dot, details not being discernible; body tapers noticeably.

It should be noted that at 250 yards and 400 yards—the blade of the foresight of the rifle approximately covers a man respectively kneeling and standing (see Fig. 1).

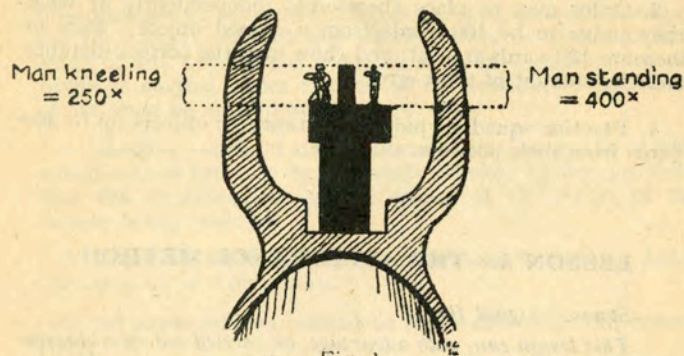


Fig. 1

3. Explain that varying conditions of light, background, size of object, and surroundings have the effect of making the object look nearer or farther away with the consequent tendency to under or over estimate. These conditions must be considered. The object will look farther away when it is indistinct, but will look nearer when it is easy to see.

4. Practise squad from all types of service positions on objects and men. Introduce time limit for judging, and shorten it as progress is made. Question squad on reasons for their estimates, and do not allow guessing.

5. Once the elementary points have been brought out continue the lesson, using enemy who are properly camouflaged and, when possible, objects such as trucks, motor cycles, light tanks, and carriers in addition.

LESSON 4.—BRACKETING AND KEY RANGES

Instructor's Notes.—Obtain accurate ranges to a number of objects and positions visible from the place selected for the lesson, between 400 yards and 1,000 yards away.

Bracketing

1. Explain that the observer estimates the longest and shortest possible distances to the object and takes the mean, e.g. longest possible, 1,000 yards; shortest possible, 600 yards—range therefore estimated as 800 yards. The greater the apparent range to the object, the wider should be the bracket.

2. Practise squad in 1 above.

Key range

3. Where a range to an object is known, other objects may be judged by estimating their distance from the known point.

4. Practise squad in 3 above.

LESSON 5.—RANGE CARDS

(For N.C.Os. and selected men only)

Instructor's Notes

Stores:—Range cards and pencils for each man.

1. Explain that whenever possible all ranges obtained should be recorded on a range card. The reason for this record is that a ready reference is of great value in the heat of battle. The range card is an article of store, and if it is not available it must be improvised. The card is marked with four equidistant semi-circles which can be used to represent any series of ranges up to 2,000 yards.

2. Explain and demonstrate the successive steps in filling in a range card:—

i. Mark off on the card the position from which the ranges are taken. Describe this position accurately.

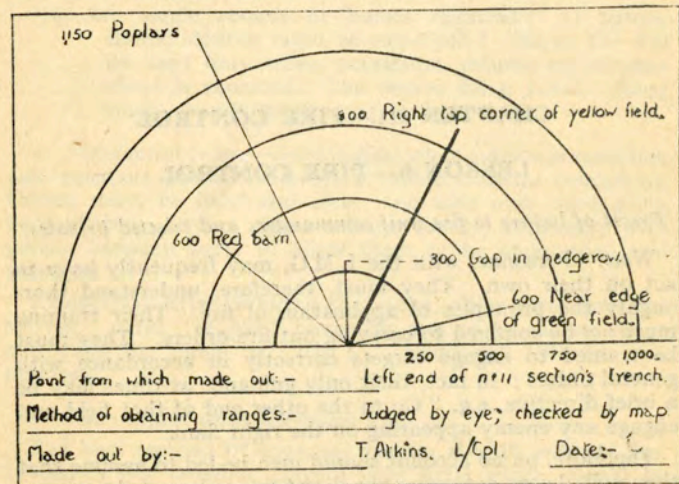


Fig. 2.—Ranges suitable for a section

- ii. Select an unmistakable object in the arc allotted, and draw a thick setting ray to it.
- iii. Select objects to which ranges are to be recorded; these should include positions which the enemy may have to occupy or near which he is likely to pass; obstacles, a gap in a hedgerow, etc. Put in range to be represented by each semi-circle on the card.
- iv. Keeping the card on the setting ray, draw rays to show the direction of the objects selected. The rays to be in lengths corresponding to the distances.
- v. Write short descriptions of each object as it appears to the naked eye. These should be written in block letters (see Fig. 2).
- vi. Write range to each object against the description.
- vii. Sign and date the card, and state how the ranges were obtained.

In use, the range card is set by raising the card level with and close to the eye and directing the setting ray on the object named. Once the card is set, objects ranged on can be identified at once by any observer.

3. Practise squad in making out range cards.

CHAPTER III.—FIRE CONTROL

LESSON 6.—FIRE CONTROL

Precis of lecture to fire unit commanders and selected privates.

Note.—Personnel with the L.M.G. may frequently have to act on their own. They must, therefore, understand thoroughly the principles of application of fire. Their training must *not* be confined to carrying out fire orders. They must be trained to engage targets correctly in accordance with general orders; in fact, their only guidance at times may be a brief directive, e.g. "Go to the other end of that field and engage any enemy appearing on the right flank"

Therefore, on no account should men be led to assume that they will always act under the direct fire orders of the section commander.

1. *Meaning of terms.*

Fire direction.—The platoon commander's orders to fire unit commanders, dealing with the application of fire according to the fire plan made by the battalion and company commander.

Fire control orders.—Orders given by a fire unit commander.

2. *Fire control.*—However skilful the man may have become, fire effect will not be obtained unless the fire unit commander can give a correct fire order. The fire unit commander must, therefore, be trained to frame fire orders and indicate targets.

3. *Considerations in opening fire.*—Fire unit commanders must seize every chance of killing the enemy. To achieve this object they must decide:—

- i. Is the opening of fire justified by the range, visibility, and vulnerability of the target? Surprise must be sought, and is often obtained by "holding fire" until the enemy is on the particular area of ground, previously selected by the fire unit commander, which will give the best chance of annihilating the enemy.
- ii. What is the best weapon or combination of weapons to use?
- iii. Are single rounds or bursts required? If bursts, should slow or rapid be employed? Rapid fire will be used only when maximum volume or surprise effect is essential. The reason for a L.M.G. firing single rounds must never be forgotten.

4. *Fire control order.*—Good indication of targets is essential, and constant practice necessary under realistic conditions. Orders must be brief and clear, and aids only used when unavoidable. Orders given calmly, loudly, concisely, with pauses between parts to allow them to be understood and acted on.

Examples.—After ordering the range, allow time for sight setting. After "Rapid" pause for aim to be taken. Give correction for range by "Up . . . hundred," "Down . . . hundred."

5. *Concentrated and distributed fire.*

The best method of engaging targets is with enfilade fire. If this is not possible, targets with little width should be engaged by concentrated fire; wide targets by distributed fire. Explain the method of distributed fire.

6. Sequence of fire control orders :—

Sequence	Reasons	Order
(1)	(2)	(3)
Designation of unit	To make it clear to whom the order is addressed.	" No. 5 section."
Range	To concentrate in recognizing the target once the sights are set and to limit the area in which to search for target.	" Five hundred."
Indication	Direction and description of point of aim.	" Quarter left—gate-way " — " Slightly right—small bush."
Kind and type of fire	Dependent on the target and situation at the time.	" Bursts — Fire " or " Rapid fire."

7. Training starts with simple fire control orders, progressing to problems including realistic battle situations. Lessons, whenever possible, will be carried out on suitable ground. When this is not available, use must be made of landscape targets.

The N.C.O. and man must have constant practice throughout their service in giving and acting upon fire control orders.

8. A valuable means of testing the N.C.O. in indication and the soldier in recognition is afforded by the use of harmonized sights with landscape targets on the miniature or 30-yd. range (see Pamphlet No. 1). The greatest value will be obtained by practice in indication and recognition on the field firing range. It will afford the opportunity of practice in observation of fire (see Appendix).

9. *Method of teaching fire control.*—In the open. Areas should be pointed out and a simple tactical situation explained. Reference points and their ranges should be settled. Three methods of setting problems are :—

- i. The instructor has two rifles placed in aiming rests and uses either one or both as required, e.g. one when it is intended to indicate a target for a concentrated order, and both for a distributed fire order, one rifle being aimed at each end of the target. Having thus indicated the target, he orders one of those under instruction to look along the sights and to give a fire order on to the target

thus indicated, to the remainder of those under instruction, who will lay aims, using aiming rests, on what they consider to be the target. The instructor looks along each rifle, insisting on accuracy of aim.

- ii. Concealed enemy are called up individually and fire blank ; meanwhile the squad, except the commander, is turned about. The enemy again conceal themselves ; the squad is turned about. The commander gives his fire control order ; the squad adjusts sights, and each man lays his rifle from his rest on the point at which he would have fired. The enemy are again called up ; aims and sights are checked.
- iii. By using men to represent enemy, problems in fire control can be staged requiring all types of fire orders. The enemy will represent various situations calling for concentrated and distributed fire. Additional situations requiring anticipatory and individual fire orders will also be arranged. The different situations will be controlled by pre-arranged signal, on which those under instruction will give their fire orders. Live ammunition will be used where possible by the enemy in these situations.

Careful rehearsal of enemy is necessary.

After each problem, fire control orders will be discussed (see para. 10 below).

Effect of wind must not be forgotten. If practice takes place on a calm day, some problems should include imaginary right or left winds.

10. *Method of discussing fire control orders.*—Full value of problems obtained only by checking aims and discussing probable fire effect. When LITTLE OR NO fire effect is obtained, the fire control order must be analysed as follows :—

- Was it given as an order in the correct sequence ?
- Was it suitable to the nature of the target ?
- Was the range approximately correct ?
- Was the indication clear and concise ?
- Was it necessary to use " aids " ?
- Was the rate of fire suitable ?
- Was the effect of wind considered by the firer ?
- Should single rounds or bursts have been used ?

11. *Fire control at night, in fog or mist.*—At night, fire control will be limited to brief commands, e.g. " Fire ", " Rapid fire ", " Stop ". The material effect may not be considerable, except

against an enemy in movement, but the moral effect will be great.

The greatest effect will be produced by foreseeing likely enemy lines of approach and by arranging to sweep these with fire. The light machine gun can be mounted on its tripod and fired on "fixed lines" or within fixed limits to cover such approaches (see Pamphlet No. 4).

LESSON 7.—RECOGNITION OF TARGETS AND NORMAL FIRE CONTROL ORDERS

Instructor's notes

Stores.—Aiming rests; landscape targets (if necessary).
Accuracy in aiming must be insisted upon at all times.

Explain :—

1. *Fire control orders.*—The orders given by the fire unit commander to his L.M.G. firer or riflemen in order that they may recognize the target, and fire at it accurately. That it is the duty of the individual firer to consider the effect of wind and allow for it (see Pamphlet No. 3, Lesson 4).

A section will normally engage targets with the L.M.G. only. Unless bursts or rapid fire are ordered the gun will invariably fire single rounds.

If the riflemen only, or both gun and riflemen, are required to fire, then "Riflemen only" or "Gun and riflemen" will be added after the designation.

2. *Concentrated fire.*—Implies that the section directs all its fire to the same point. When a large target is engaged, a definite point of aim will be given, e.g. right or left end, top corner. With small targets where no point of aim is given, aim will be directed at the centre.

3. *Distributed fire* (see Fig. 3).—It may be necessary to engage a wide target, such as enemy lining a hedgerow, from one end to the other. Such a target requires the fire to be distributed. The extent of the target will be indicated immediately after one end of it has been named. The fire order is obeyed :—

- i. *By the light machine gunner* distributing his fire by single rounds or in bursts at irregular intervals between the limits of the target, and avoiding systematic traversing.
- ii. *By riflemen* firing at the approximate points between these limits corresponding with their places in the section.

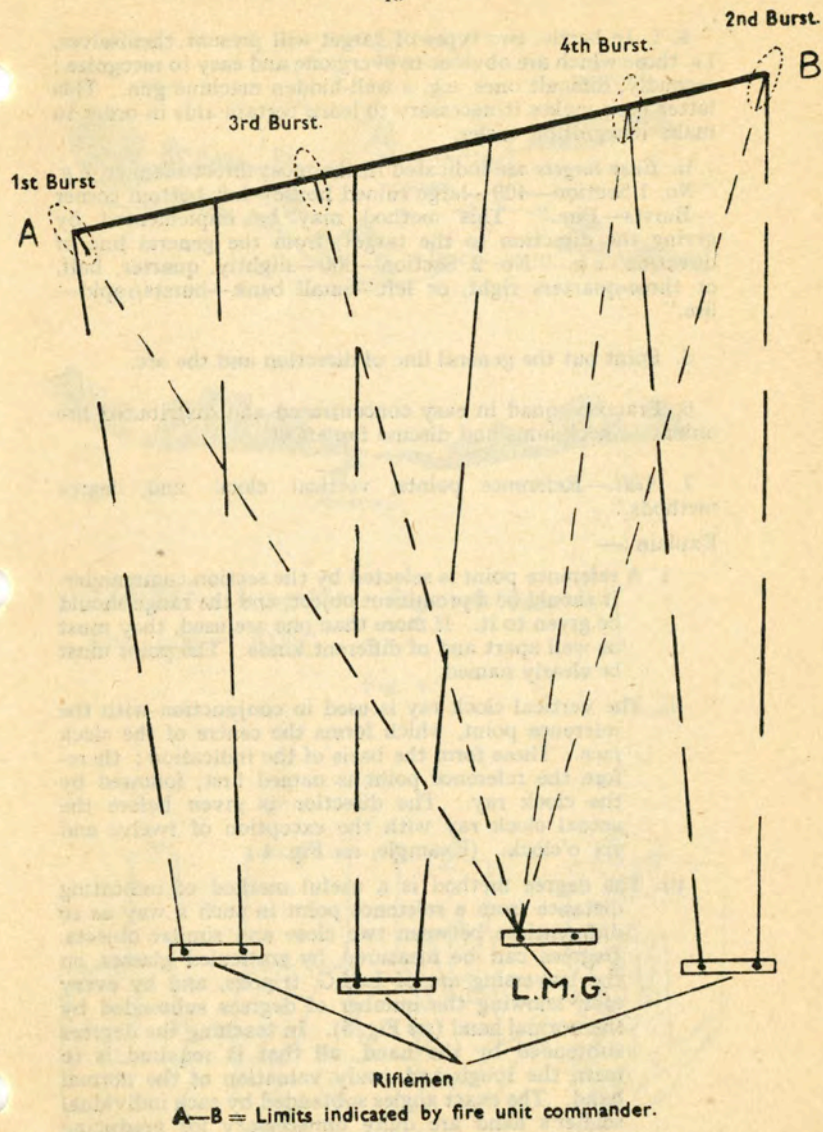


Fig. 3

4. i. In battle, two types of target will present themselves, i.e. those which are obvious to every one and easy to recognize; secondly, difficult ones, e.g. a well-hidden machine gun. This latter type makes it necessary to learn certain aids in order to make recognition easier.

ii. *Easy targets* are indicated in the most direct manner, e.g. "No. 1 Section—400—large ruined house—left bottom corner—Bursts—Fire." This method may be implemented by giving the direction to the target, from the general line of direction, e.g. "No. 2 Section—300—slightly, quarter, half, or three-quarters right, or left—small bank—bursts/rapid—fire."

5. Point out the general line of direction and the arc.

6. Practise squad in easy concentrated and distributed fire orders. Check aims and discuss fire effect.

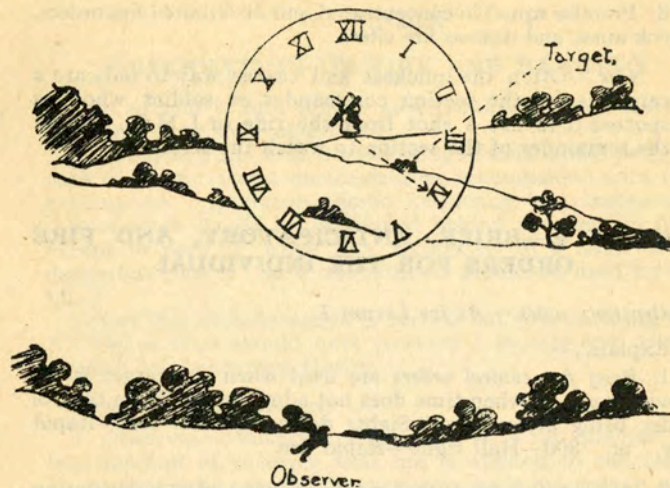
7. *Aids*.—Reference points, vertical clock and degree methods.

Explain:—

i. A reference point is selected by the section commander. It should be a prominent object, and the range should be given to it. If more than one are used, they must be well apart and of different kinds. The point must be clearly named.

ii. The vertical clock ray is used in conjunction with the reference point, which forms the centre of the clock face. These form the basis of the indication; therefore the reference point is named first, followed by the clock ray. The direction is given before the actual clock ray with the exception of twelve and six o'clock. (Example, see Fig. 4.)

iii. The degree method is a useful method of indicating distance from a reference point in such a way as to differentiate between two close and similar objects. Degrees can be measured by graticuled glasses, on the traversing arc of L.M.G. tripods, and by every man knowing the number of degrees subtended by the normal hand (see Fig. 5). In teaching the degrees subtended by the hand, all that is required is to learn the rough and ready valuation of the normal hand. The exact angles subtended by each individual soldier's hand are quite unnecessary for producing adequate indication.



EXAMPLE: Windmill - Right 4 o'clock -
small bush - FIRE.

Fig. 4

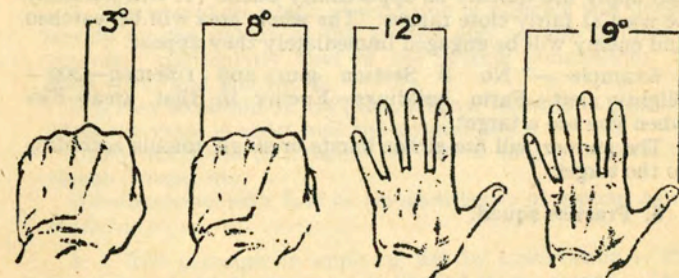


Fig. 5

8. Practise squad in concentrated and distributed fire orders, check aims, and discuss fire effect.

Note.—Often the quickest and easiest way to indicate a target is for the section commander or soldier who has spotted it to fire a shot from the rifle or L.M.G., and for the remainder of the section to watch the strike.

LESSON 8.—BRIEF, ANTICIPATORY, AND FIRE ORDERS FOR THE INDIVIDUAL

Instructor's notes.—As for Lesson 7.

Explain :—

1. *Brief fire control orders* are used when the target is an obvious one, or when time does not admit of a full fire control order being given, e.g. "Sights down—Quarter left—Rapid fire," or "300—Half right—Rapid fire."

2. *Anticipatory fire control orders* are used when anticipating either the movements of our own troops or those of the enemy.

Example :—

"No. 5 Section—400—Farm house—Immediately below—Hedgerow—Open rapid—Await my order."

From the above it will be seen that all preparations for opening fire have been made, but the actual opening of fire is withheld until it is required.

3. Practise squad.

4. Explain :—*Fire orders for individual fire.*—The order is designed to ensure that the gunner or any individual rifleman can apply fire quickly as opportunity offers. It will normally be used at fairly close ranges. The whole area will be watched and enemy will be engaged immediately they appear.

Example :—"No. 3 Section gun and riflemen—300—Slightly left—Farm buildings—Enemy in that area—Fire when you see a target."

The gunner will fire either bursts or single rounds according to the target.

5. Practise squad.

APPENDIX

OBSERVATION OF FIRE AND RANGING

This subject is best taught as a demonstration on a field firing range or area of ground.

As many as possible of the following lessons should be given, each in the form of a demonstration accompanied with brief explanation. Spectators should frequently be questioned.

Spectators should be positioned behind the weapon firing except in para. 7, when they should be to a flank of the dangerous zone. Tracer ammunition should be used for this phase.

Before this demonstration is carried out it is essential that N.C.Os. at least should have received a lecture and demonstration in elementary theory.

Explain and demonstrate :—

1. Observation of fire is vital, since it is the quickest and best method of ensuring that fire is applied to the target. It automatically counteracts the errors made not only in range estimation but also in the sighting of the weapons themselves.

(This demonstration may be carried out by a L.M.G., known to shoot low, firing at a ground target with the true range to the target on the sights—alteration then being made to apply the fire to the target.)

2. Observation of fire is far more easily obtained from the L.M.G., because of its closer grouping, than from riflemen. The fire of the L.M.G. should therefore be used, as a rule, as the basis of applying fire by observation, rather than that of the riflemen.

(Demonstrate with (i.) L.M.G., (ii.) riflemen firing at a ground target.)

3. The extent to which observation is possible will depend largely on the nature of the ground and on the training of the men, particularly that of the section commander, the Bren firer, and the No. 2.

It is easy to obtain on dry plough, sand, water, and grassland when the grass is short and the ground dry.

Observation will be difficult in wet or long grassland, wet plough, crops, etc.

(Demonstrate with L.M.G. on such types of ground as are available.)

4. i. The principle in applying fire by observation is that the *centre* of the beaten zone is applied to the target. Thus, if shots are observed to be striking both short of and beyond

the target, it may be assumed that the beaten zone is correctly applied. (But see para. 7 below.)

(Demonstrate with L.M.G. on ground target.)

ii. The beaten zone will almost invariably have a few wide shots round its edge. Care must be taken, therefore, not to take the strike of single bullets as showing the centre of the beaten zone: if the ground will show the strike of one bullet it would show more if they were there.

5. Alterations in sight adjustment must always be made boldly, and normally never less than 100 yards at a time. This rule is especially important when applying fire to a forward slope, when an alteration of 100 yards will lift the beaten zone a few feet only. Moreover the length of the beaten zone is automatically foreshortened on rising ground; there is not, therefore, the same margin of latitude available.

(Demonstrate with L.M.G. both on level ground and forward slopes if possible. A stop butt may be used as a forward slope.)

6. Should observation be unobtainable, the best method is to bring the sights well down and to try to get observation at some point nearer than the target, thereafter applying the beaten zone on to the target by observation if possible, or, failing that, by estimation.

(Demonstrate with L.M.G.)

7. It must be realized that on level ground the target may be included in the dangerous zone, and **not** necessarily in the beaten zone. Provided that the ground is fairly level, the target is fairly high, i.e. men walking, and the range is not greater than about 600 yards, it will generally be best to apply the beaten zone *beyond the actual target* in order to get the maximum effect from the bullets. This fact is not normally appreciated in fire control.

(Spectators on flank between L.M.G. and near end of beaten zone. Tracer used if available—failing this, targets placed out to show trajectories of bullets when inspected.)

8. The term "ranging" implies the ascertaining of the range to a probable target—such as a gap the enemy must pass—*before* the enemy are actually seen. While it ensures that when they appear the greatest possible fire effect will be instantly produced, this advantage must be balanced against the disadvantage of the probable loss of surprise effect.

(Demonstrate with L.M.G.—bringing up surprise targets after "Ranging.")