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1st A R Wadsworth  
M. I. Corps.  
Grantham

*M. G. Corps  
Grantham*

No. 1 LECTURE.

**TRAINING OF MACHINE GUNNERS.**

**Lecture Notes.**

1. *Standard of Training Required.*—

- (a) Officers and N.C.Os.: A thorough knowledge of the mechanical, theoretical and tactical side of their work.
- (b) Men: Experts in the mechanical and practical side of training.

2. *The Machine Gunner a Specialist.*—

- (a) In order to reach the required standard.
- (b) Because on the machine gunner (as for the artillery gunner) the success and safety of the infantry depend.

3. *Selection of Personnel.*—

- (a) Intelligence or common-sense.
- (b) Education.
- (c) Physique.
- (d) Mechanical, i.e., logical mind.

4. *Training.*—

(Not including training of range takers, bombers, scouts, &c.)

Physical: Physical exercises, running, &c.

Mechanical (indoors): Mechanism, stripping, repairs, &c.

Practical (open country): Drill, visual training, judging distances, fire orders, &c.

Tactical: Characteristics, occupation of positions, &c.

5. *Training with other Troops.*—

- (a) Training incomplete unless teams have been trained in combination with other troops.

This should not be done until foregoing training has been dealt with.

- (b) The need for close co-operation between gunners, sections, companies and own infantry at all times cannot be too greatly impressed.
- (c) The aspects of the various formations of other troops should be taught.

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# M. G. T. C.

## No. 2 LECTURE.

### ALLOCATION OF DUTIES.

#### Lecture Notes.

##### 1. *General.*—

- (a) The various duties of Officers, N.C.Os., and men are enumerated in the Machine Gun Training Manual.
- (b) All should be interchangeable.

##### 2. *Machine Gun Company Establishments.*—

- (a) Personnel.
- (b) Material.
- (c) Horses and transport.
- (d) Ammunition per gun.

##### 3. *Duties.*—

Company Commander : Responsible for :—

- (a) The training of his company.
- (b) Tactical employment.

2nd in Command : Responsible for administration.

Section Officer : To command his section in accordance with orders from his Company Commander, and in absence of orders, in accordance with the tactical situation. In action, most important duties are :—

- (a) Reconnaissance.
- (b) Selection of gun position.
- (c) Selection of alternative positions.
- (d) Observe and control fire.
- (e) Regulate ammunition supply.
- (f) Issue instructions regarding movement of limbered wagons.

Serjeant :—

- (a) To supervise guns coming into action.
- (b) Decides upon exact position for tripods.
- (c) Assists in fire control.

Corporal :—

- (a) Superintends packing and unpacking of limbered wagons.
- (b) Moves limbered wagons to suitable position.
- (c) Responsible that ammunition, water, oil, &c., are supplied to guns as necessary.

# M. G. T. C.

## No. 4 LECTURE.

### INDICATION AND RECOGNITION.

#### Lecture Notes.

1. *Indication, Definition.*—The shortest and most easily understood description of an aiming point by a Commander.
2. *Why Necessary.*—To ensure the cone of fire striking the target as required.
3. *Method of Teaching.*—Taught in two stages :—
  - (a) Normal method. Descriptions without aid.
  - (b) Description with aids.  
A front will always be pointed out. Objects must always be described as seen with the naked eye and not as seen through glasses.
4. *Aids.*—Only used when absolutely necessary :—
  - (a) Reference objects.
  - (b) Use of the hand.
  - (c) Clock rays.
5. *Recognition, Definition.*—The gunner's understanding of the exact point at which his Commander wishes him to aim.  
Military vocabulary and trained eyesight are essential factors in preparing men for recognition.  
Object: To teach men to recognise aiming points on which to lay the guns.  
Method of Teaching :—
  - Elementary Stage: Landscape, with or without guns. Recognition always checked.
  - Advanced Stage: Open country—intervals between guns gradually increased.

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(c) Examination of Sound: Object, to enable men to make clear reports, to understand instructions, and to recognise features of military importance.

(1) Definite line in landscape described in detail.

(2) Areas of ground examined and described. Large areas divided into sections; i.e., foreground, middle distance and background, &c.

(3) Road work.

(d) Recognition.—

Object, to train the gunner to recognise targets described. Dealt with in Lecture on Indication and Recognition.

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## No. 4 LECTURE.

### INDICATION AND RECOGNITION.

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## No. 5 LECTURE.

### RANGING.

#### Lecture Notes.

RANGING.—The means adopted for ascertaining the sighting elevation required to hit an object.

1. *Necessity for Ranging.*
2. *Principal Methods.*—
  - (a) J.D.
  - (b) Instruments.
  - (c) Combination of (a) and (b)—Range cards.
  - (d) Observation of bullets.
3. *Methods of Training in J.D.*—
  - Unit of measure.
  - Appearance.
  - Bracketing.
4. *Lateral J.D.*—
  - Necessity for and how taught.
5. *Range Taking with Instruments.*—
  - Special courses of instruction.
- 6.\**Range Cards—Attack—Defence.*
7. *Observation of Fire.*—
  - Value of observation.
  - Method of ranging by gunner.
  - Signals—Semaphore.
8. *Other Methods of Ranging.*—
  - (a) Use of maps.
  - (b) Sound.
  - (c) Information from other troops.
  - (d) Forward or back reckoning.

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\* Method of preparation dealt with separately.



# M. G. T. C.

## No. 6 LECTURE.

### MACHINE GUN RANGE WORK, I.

#### Lecture Notes.

GENERAL MACHINE GUN COURSE divided into two parts:—

Part I.—Fired on 25 yards range.

Part II.—Classification and Observation Practices.

#### OBJECT OF PART I.

1. The practices of Part I. are designed to embrace all points of elementary training, *i.e.*, laying, holding, traversing, searching, &c. They also emphasise the necessity for attention to points before, during, and after firing. By carrying out these points without assistance, and remedying stoppages which occur, the essential quality of self-reliance is developed.
2. No man fires until he has passed the Tests of Elementary Training.
3. *Instructional.*—
  - (1) No official records kept other than ammunition expended.
  - (2) Section Officers keep records of results of each man's firing.
  - (3) No time-limit.
  - (4) Repetition.
4. *Method of Instruction.*—
  - (1) Instructor watches firer—not the target.
  - (2) If mistakes are made, cease fire and criticise.
  - (3) Criticism at target on conclusion of practice.  
General procedure throughout as at drill.
5. *Range Discipline.*—
  - (1) Quiet instruction essential.
  - (2) Safety regulations complied with re danger flags, &c.
  - (3) No one permitted in front of socket during firing.
  - (4) Before going to target—guns unloaded, locks raised.
  - (5) Before returning to quarters—points after firing attended to.
  - (6) Strict adherence to fire orders.

### 6. Method of Giving Fire Orders.—

- (a) Calmly—otherwise confusion.
- (b) Loud—sufficient for everyone concerned to hear.
- (c) Pauses—to allow each part to be understood, acted on, and if necessary repeat.
- (d) Concise—telegraphic in nature.

The range, if necessary, given first.

Range and indicator may be given either before or after guns are in position.

Fire is usually opened and always stopped by signal.

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## No. 7 LECTURE.

### CHARACTERISTICS, I.

#### Lecture Notes.

##### *General.*—

- (a) Tactical handling based on characteristics.
- (b) Resembles rifle as regards calibre and range.
- (c) Cavalry and infantry weapon fired at cavalry and infantry ranges.
- (d) Resembles artillery, *i.e.*, firing from fixed platform.

##### 1. *Fixed Platform.*—

- (a) Causes personal factor to be reduced.
- (b) Gives close grouping. (Boring effect.)

##### Deductions affecting tactical employment :—

- (a) Approximately same results in war as in peace.
- (b) Valuable in a crisis.
- (c) Facilitates observation and makes it reliable.
- (d) Overhead fire possible.
- (e) Facilitates maintenance of elevation and direction by night.
- (f) Necessitates accurate ranging.
- (g) Emphasises oblique and enfilade fire.

##### 2. *Rapid Production of Large Volume of Fire.*—

When gun is " in Action " an intense fire can be opened at any moment.

##### Deductions :—

- (a) Suitable for surprise effect.
- (b) Gun particularly valuable on outpost, especially at night.
- (c) Enables Commander to produce the maximum volume at the shortest possible notice.

##### 3. *Narrow Front, Shallow Depth.*—

One gun, with numbers, requires six square feet (maximum).

##### Deductions :—

- (a) Valuable in cramped localities.
- (b) Enables the gun to take advantage of small or isolated cover.

(c) Releases infantry in defence, thereby reducing casualties, and allowing a greater number of men for offensive action.

4. *All-round Traverse.*—

Gun turned quickly in any direction.

Deduction:—

Indicates action on a flank or detached post.

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## No. 8 LECTURE.

### CHARACTERISTICS, II.

#### Lecture Notes.

##### 5. *Incalculability.*—

Two men only required to serve gun.

About 100 men with rifles required to produce the same fire power. Therefore casualties of personnel less, except if subjected to concentrated fire of artillery.

Deductions :—

- (a) Numbers must be interchangeable.
- (b) Reserve companies to replace casualties after action.
- (c) No more men with gun than necessary.
- (d) Skillful use of ground and cover.
- (e) Artillery the greatest enemy.

##### 6. *Mobility.*—

Comparative mobility of machine guns and number of riflemen required to produce equivalent fire effect.

Mobility when not under fire, *i.e.*, guns on limbers :  
Greater than infantry.

Deductions :—

Reserve of fire power in hands of Commander.

Mobility when under fire : Less than infantry.

Deductions :—

- (a) Limbers and guns brought as near as possible to fire position, compatible with safety of animals.
- (b) In action avoid frequent movement, unless :  
To give close support.  
To consolidate ground.  
To avoid shell fire.

##### 7. *Accidental Cessation of Fire.*—

An adverse characteristic. Due chiefly to want of care of gun, rarely to faults in mechanism. Gun may stop firing due to :—

- (a) Want of care.
- (b) Mechanical.

Both overcome by thorough training in the following :—

- (a) Constant care and cleaning of gun, &c.
- (b) Immediate action.
- (c) Careful placing of spare parts.
- (d) Highly trained Nos. 3.

8. *Noise of Firing, Flash, Oil Vapour, Steam.*—

Adverse characteristics. Peculiar noise attracts attention, minimised by "Claquement." Flash plainly visible in dull weather and at night. Oil vapour due to oily barrels and oil in muzzle attachments. Steam—should be infrequent.

## Deductions :—

- (a) Skilful use of cover.
- (b) Alternative positions.
- (c) Use of stove pipe attachment, wet sandbags, &c.
- (d) Dry barrels and muzzle attachments before firing.
- (e) Timely fitting of condensers.

## Summary of Characteristics :—

- (1) A close range weapon.
- (2) Overhead, indirect, and night firing possible.
- (3) Fire power = 100 rifles at least.
- (4) Frontage = that of two men.
- (5) Termed a weapon of opportunity.

Opportunities will not often come to those who are content to await them passively; they must be looked for. The good M.G. Commander, by keeping himself in close touch with the situation, and handling his guns with boldness and cunning, will make opportunities.

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No. 9 LECTURE.

MACHINE GUN RANGE WORK, II.

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Lecture Notes.

1. Part II. contains :—  
Ranging Practice (No. 7).  
Classification Practice (Nos. 9 & 10).  
Observation Practice (No. 13).  
Firing from Successive Positions (No. 14).
2. *Time Limit imposed.*
3. *Method of Conducting.*
4. *Method of Scoring and Classification.*
5. *Duties of Supervising Officers.*

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## No. 10 LECTURE.



### FIRE DIRECTION.

#### Lecture Notes.

##### 1. Definition.—

The term "Fire Direction" as applied to machine guns includes all duties of M.G. Commanders which ensure that the fire from their guns is applied to the best tactical advantage.

##### 2. Most Important Technical Terms.—

- (a) Line of Sight.
- (b) Trajectory, Culminating Point, First Catch, First Graze, Dangerous Space.
- (c) Cone of Fire, Beaten Zones, Danger Zone.
- (d) Angle of Sight.
- (e) Angle of Tangent Elevation. 
- (f) Angle of Quadrant Elevation. 

##### 3. Method of Fire.—

Guiding principle of M.G. fire—produced and applied in groups varying in volume according to the nature of target and the position from which engaged.

##### 4. Application of Fire.—

Dependent on appreciation of and allowance for:—

- (a) Climatic conditions.
- (b) Permissible and probable errors in ranging.

Regarding (a)—Necessary to study Elevation and Wind Tables.

ELEVATION TABLE.

More.	Less.
Extreme dryness.	Wet.
Extreme cold.	Hot.
Head wind.	Rear wind.
Bright light.	Dull light.

WIND TABLE.  
(Approximate Allowances.)

Range.	Mild.	Fresh.	Strong.
	For right-angle winds allow :—		
500*	2 feet.	4 feet.	6 feet.
1000*	3 yards.	6 yards.	9 yards.
1500*	5 yards.	12 yards.	18 yards.
2000*	12 yards.*	24 yards.*	36 yards.*
2500*	24 yards.*	48 yards.*	72 yards.*

\* Theoretical.

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# M. G. T. C.

## No. 11 LECTURE.

### FIRE DIRECTION, II.

#### Lecture Notes.

1. *Devices for Overcoming Errors in Ranging* :—

- (1) Combined sights.
- (2) Searching.

2. *Combined Sights*.—

- (a) Definition.
- (b) Rules governing use of :—
  - (1) Minimum range.
  - (2) Differences of elevation.
  - (3) Ground to be searched.
  - (4) Number of guns required.
  - (5) Sighting elevation to order.

3. *Practical Examples*, to exemplify :—

- (1) Correct overlap of zones.
- (2) No overlap.
- (3) Overlap too small.

4. *Fire Orders using Combined Sights*.—

- (a) Using one aiming mark.
- (b) Using separate aiming mark for each gun.

5. *Searching*.—

- (1) Definition.
- (2) Principle of.
- (3) When used.
- (4) Examples.
- (5) Fire orders for searching.

*Note*.—Both devices are suitable for engaging target of great depth. Example: Bridges, roads, &c.

6. *Traversing*.—

Definition: A device for engaging linear targets.

Methods:

- (a) Group traversing.
- (b) Swinging traverse.

As regards (a): A slow method requiring careful training. When engaging linear targets, effect should be sought by bringing oblique fire to bear, thus reducing traversing to a minimum. At ranges up to 1,000 yards, one gun, firing one belt, can cover approximately 25 yards of front in one minute.

As regards (b): At a range of 800 yards, one gun will cover approximately 30 yards of front in five seconds. Fire orders when traversing required.

Note.—Searching and traversing may be combined as required.

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No. 12 LECTURE.

FIRE DIRECTION III.

Lecture Notes.

1 *Overhead Fire (Direct).*

- (a) Rules for
- (b) Safety angles—how obtained.
- (c) Methods of applying safety angles :—
  - (1) Machine gunner's protractor.
  - (2) Tangent sight.
  - (3) Combination of (1) and (2).

2. *Indirect Fire.*

- (a) Summary of methods as regards direction and elevation for :—

- (1) Obtaining.
- (2) Putting on the gun.
- (3) Maintaining.

	DIRECTION.	ELEVATION.
Obtained by	Posts alone. Map and compass. Map, protractor, and reference object.	Graticules. Contoured map.
Put on by means of	Posts and compass. Reference object and direction dial.	Elevation dial. Tangent sight.
Maintained by	Auxiliary aiming mark. Direction dial.	Auxiliary aiming mark. and tangent sight. Elevation dial.



CANCELLED.—See Over.

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No. 12 LECTURE.

**FIRE DIRECTION, III.**

**Lecture Notes.**

1. *Auxiliary Line of Sight.*—

- (a) Definition: A line of sight to an aiming mark, other than the target to be engaged.
- (b) Object: To enable the firer to maintain elevation and direction when the target engaged is not visible, e.g., during a gas attack.

2. *Night Firing.*—

- (a) When gun is laid by day and can be left in position.
- (b) Brought into position for first time by night.
- (c) Devices: mirrors, luminous stones, &c.

3. *Overhead Fire (direct).*—

- (a) Rules for.
- (b) Safety angles—how obtained.
- (c) Methods of applying safety angles:—
  - (1) Machine gunner's protractor
  - (2) Tangent sight.
  - (3) Combination of (1) and (2).

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No. 13 LECTURE.

FIRE DIRECTION IV.

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Lecture Notes.

- (1) Use of
  - (a) Spirit level.
  - (b) Dials.
- (2) Details of methods in para. 2, Lecture 12.
- (3) Night firing.

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CANCELLED.—See Over.

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No. 13 LECTURE.

FIRE DIRECTION, IV.

**Lecture Notes.**

1. *Indirect Fire.*—

- (a) Spirit level method.
- (b) Spirit level, elevating dial and map.
- (c) Clinometer and map.
- (d) Graticule method.

2. *Testing and Adjusting Clinometers.*

3. *Searching Reverse Slopes.*

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# M. G. T. C.

## No. 14 LECTURE.

### USE OF GROUND AND COVER.

#### Lecture Notes.

GENERAL.—The use of ground and cover is based on producing the maximum fire power with the minimum of exposure.

1. *Study of Ground.*—Ground and artificial features used for:—

- (a) Concealment of movement.
- (b) Positions.

Regarding (a) : At all times turned to account.

Regarding (b) : Occupation governed by:—

- (1) Fire effect.
- (2) Concealment.
- (3) Cover from fire.
- (4) Communication and ammunition supply.
- (5) Nature of the action.

2. *Ground Features.*—

- (a) Folds in ground.
- (b) Mounds of earth, roots, &c.
- (c) Banks.
- (d) Ditches.
- (e) Hedges.
- (f) Crops.
- (g) Trees.
- (h) Woods.

3. *Artificial Features.*—

- (a) Barricades.
- (b) Haystacks.
- (c) Houses and buildings.
- (d) Stacks of wood, &c.
- (e) Stooks of corn.

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# M. G. T. C.

## No. 15 LECTURE.

### **MACHINE GUNS IN OPEN WARFARE, I.** **(General Principles.)**

#### **Lecture Notes.**

1. *Responsibility for Command.*
2. *Orders Issued.*—
  - (a) Direct to the Nos. 1.
  - (b) Through Sub-section and Section Commanders.
  - (c) By orderlies to Sub-section or Section Commanders, or to Nos. 1.
  - (d) Method of conveying an order—verbal, signalled, written.
- Control of Guns.*—
  - (a) Singly.
  - (b) By Sub-sections, i.e., 2 guns.
  - (c) By Section, i.e., 4 guns.
  - (d) By Sections.
3. *Reconnaissance.*—
  - (a) Study of ground by actually visiting it.
  - (b) Use of glasses.
  - (c) Use of maps.
4. *Co-operation.*—
  - (a) Between machine-guns.
  - (b) With infantry.
  - (c) With artillery.
5. *Justification for Opening Fire.*—
  - (a) Surprise.
  - (b) Effect on enemy.
  - (c) Supporting infantry.
6. *Targets.*—
  - (a) Troops advancing in depth.
  - (b) " " in extended order.
7. *Movement.*—
  - (a) Whenever possible move into position under cover.
  - (b) In open mix with infantry in same formation.
  - (c) In action masks and gloves should be worn.

- 8. *Selection of Fire Position. Alternative positions.*—
  - (a) Careful reconnaissance.
  - (b) Tactical situation and object in view.
  - (c) Requirements of a good machine-gun position.
  - (d) Features of an alternative position.
  - (e) Selection of actual gun position.
  
- 9. *Concealment of Guns.*—
  - (a) Natural cover.
  - (b) Digging.
  
- 10. *Machine-Guns and Hostile Artillery.*—
  - (a) Concealment emphasised.
  - (b) If located and shelled.
  - (c) Engaging artillery.
  
- 11. *Escorts for Machine-Guns.*—
  - (a) In action.
  - (b) When on limbers.
  
- 12. *Boldness.*—
  - (a) Maximum support to infantry.

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## No. 16 LECTURE.

### MACHINE GUNS IN OPEN WARFARE, II. (The Attack.)

#### Lecture Notes.

##### 1. Preliminary Arrangements.—

- (a) Importance of a constructive policy.
- (b) First consideration pending definite orders.
  - (1) Best position for supporting attack.
  - (2) Best distribution of guns.
  - (3) Location of enemy machine-guns.
  - (4) Selection of further positions.
  - (5) Co-operation with Lewis guns.
  - (6) Arrangements for ammunition supply.
  - (7) Disposition of limbers.
  - (8) Ranges necessary to take.
- (c) Action by Company Commander on receiving orders from Brigadiers :—
  - (1) Inform Brigadier as to his intentions.
  - (2) Issue detailed orders to Section Officers.
- (d) Action of Section Officers.—
  - (1) Allot tasks to gun teams.
  - (2) Explain general situation.

##### 2. Methods of Supporting Infantry.—

- (a) Fire from flanks.
- (b) Overhead fire.
- (c) Long-range searching fire.
- (d) Fire from a forward position.

##### 3. Distribution of Guns and their Duties.—

- (a) Those allotted to attacking infantry.
- (b) Those guns covering advance of infantry.
- (c) Those guns in reserve in hands of Brigadier.

##### 4. Transport and Ammunition Supply.—

- (a) When close touch is impossible due to hostile artillery.
- (b) When close touch is possible. (See Lecture No. 2.)

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5. Positions of Commanders.—

Company Commander: With Brigadier.

Section, Sub-section Commander:

(a) Where they can observe fire.

(b) Where they can observe own troops and enemy's movements.

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No. 17 LECTURE.

MACHINE GUNS IN OPEN WARFARE,  
III.

(The Defence.)

Lecture Notes.

1. *Method.*—

To place guns in such a manner that if all are fired simultaneously the whole of the ground in front of a position will be automatically swept by a *belt of fire*.

2. *Necessity for Co-operation.*—

- (a) Concerted plan from Company Commander.
- (b) Co-operation with Lewis guns.
- (c) Each gun allotted definite position.

3. *Lines of Retirement to Secondary Positions.*

4. *Position of Limbered Wagons and Ammunition Supply.*

5. *Inter-communication* between Company Commander and Section Officers also between Officers and their guns.

6. *Guns other than those Allotted to Create Belt.*—

- (a) Covered approaches commanded.
- (b) In reserve.

7. *Reconnaissance.*—

- (a) Inter-communication.
- (b) Movement of guns.
- (c) Movement of transport and ammunition.
- (d) Effectually checkmating enemy's operations.

8. *Range Cards.*

9. *Arrangements for Night Firing.*—

Best position by day not necessarily best at night.

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## No. 18 LECTURE.

# MACHINE GUNS IN OPEN FIGHTING, IV.

### Lecture Notes.

#### 1. *Machine-Guns with Advanced Guards.*—

- (a) Large proportion allotted.
- (b) Duties.
- (c) Position.

#### 2. *Machine-Guns with Rear Guards.*—

- (a) Ideal form of rear guard is a force of machine-guns supported by new infantry.
- (b) Occupation of positions.
- (c) Position of transport.
- (d) Alternative position in rear.
- (e) Covering retirement.
- (f) Thorough reconnaissance and use of ground.

#### 3. *Machine-Guns in Village Fighting.*—

- (a) Not brought up till infantry make good outer edge of village.
- (b) Duties.

#### 4. *Machine-Guns with Outposts.*—

- (a) Necessity for careful siting and bold handling.
- (b) Position of guns by day.
- (c) Necessity for range cards.
- (d) Position of guns by night.

#### 5. *Machine-Guns in Wood Fighting.*—

- (A) When wood is in front of a defensive line :—
  - (1) Encircle wood with fire if possible.
  - (2) Deny all exits from wood from which assaults may come by cross-fire.
  - (3) Create "belt" of fire within wood by machine-guns placed outside.

(a) When wood is cut by defensive lines :—

- (1) If line has been pushed forward, cover front of wood from flanks.
- (2) If line has not been pushed forward, place machine-guns, if possible, forward and on flanks.
- (3) If front of wood is behind enemy's line, cover flanks of wood.
- (4) In all cases create belt of fire within wood itself. In case of dense woods, by cutting lanes or using existing footpaths, &c. These lanes should have obstacles on their near sides.

Grantham, 30/5/16.

M. G. T. C.

No. 19 LECTURE.

MACHINE GUN FIELD WORKS, I.

Lecture Notes.

1. *Definitions.*—

- (a) Trench system.
- (b) Influence of ground and "command" on construction.
- (c) Details of trenches, &c., in a "Trench System."
- (d) Constructional details, *i.e.*, parapet, parados, &c.
- (e) Entanglements.
- (f) Types of tools.
- (g) Materials.

2. *Penetration and Destructive Effect of Projectiles.*—

- (a) Bullets.
- (b) Bombs, splinters and small shells.
- (c) Large shells.

3. *Working Parties.*—

- (a) Reliefs.
- (b) Method of requisitioning for working parties :—
  - (1) Number required all ranks.
  - (2) To whom to report, time, place.
  - (3) Nature of party, carrying or working.
  - (4) Tools required.
  - (5) Nature and duration of task.
  - (6) Special points, *e.g.*, rations, kit, &c.
- (c) Estimate of tools required :—
  - Per 100 men : 110 shovels.
  - 55 picks.
  - 60 helves.
  - 10 crowbars.
- (d) Allotment of tasks.

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# M. G. T. C.

## No. 20 LECTURE.

### MACHINE GUN FIELD WORKS, II.

#### Lecture Notes.

##### 1. *General.*—

- (1) Time, labour and material, chief factors.
- (2) Working parties provided by Brigade.
- (3) Work supervised by a M.G. Officer.
- (4) When elaborate work required, aid obtained from R.E.
- (5) Obstinate defence of front trenches depends on machine-guns, therefore gunners must be at their posts during bombardment.

##### 2. *Sequence of Work.*—

- (1) Dug-outs.
  - (2) Open emplacements.
  - (3) Splinter-proof look-out posts.
  - (4) Splinter-proof emplacements.
  - (5) Concrete emplacements.
- (1) Strong dug-outs :—
    - (a) How sited.
    - (b) Construction, method of.
    - (c) Minimum size.
    - (d) Distance from gun positions, &c.
  - (2) Open emplacements :—
    - (a) When and how constructed.
    - (b) Dimensions.
  - (3) Splinter-proof look-out posts :—
    - (a) Object of.
    - (b) Construction.
  - (4) Closed or splinter-proof emplacements :—
    - (a) Necessity for.
    - (b) Minimum dimensions.

##### 3. *Siting of Emplacements.*—

- (a) Dependent on position of guns.
- (b) Guiding rules.

##### 4. *Concealment of Emplacements.*—

- (a) Assimilation with surroundings.
- (b) Loopholes masked or defiladed.



5. Positions of Emplacements.—

- (a) In front of own obstacles.
- (b) In front of parapet.
- (c) In the parapet.
- (d) Behind the parapet.

6. Concrete Emplacements.—

- (a) Where applicable.
- (b) Additional material required.

Depends on quality of lime :—

- (1) One of quicklime to four of ashes.
- (2) One of slaked lime to two of pounded brick.
- (3) Cement if obtainable.
- (4) Ration boxes for moulds.

Grantham, 30/5/16.

M. G. T. C.

MISCELLANEOUS HEADINGS, NOT  
DEALT WITH IN THE LECTURE

(ATTACHED TO LECTURE 20).

Lecture Notes.

1. *Tunnelling.*—

- (1) Tunnels may be used :—
  - (a) As covered emplacements.
  - (b) As passages to an emplacement.
  - (c) As a dug-out.
- (2) Methods of construction :—
  - (a) Architectural with—
    - Sole piece.
    - Uprights.
    - Lintel.
    - Wedges.
    - Dogs or stops.
  - (b) Coal mining method with—
    - Feet.
    - Legs.
    - Bars.
    - Wedges.
    - Lids.
  - (c) Combination of (a) and (b).

2. *Constructional Details.*—

- (1) Protection necessary for guns and teams from rifle, shell, shrapnel, splinter, bombs and small H.E. :—
  - (a) Parapet.
  - (b) Headcover.
  - (c) Overhead cover.
- (2) Material :—
  - (a) Loophole boxes.
  - (b) Posts and sleepers.
  - (c) Corrugated iron.
  - (d) Sandbags, rabbit wire, nails, &c.

The Staff Captain of the Brigade responsible for producing material on demand.

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M. G. T. C.

No. 21 LECTURE.

MAP READING.

Lecture Notes.

1. *Definition of, and necessity for Proficiency in Map Reading.*—  
Maps only aid to study of ground, and not a substitute.
2. *Definitions: Topographical, &c.:*—  
Basin, Saddle, Crest, Gorge, Knoll, Plateau, Re-entrant,  
Salient, Spur, Watercourse, Watershed.  
  
Bearing, Ray, Contour, Gradient, Hachures, H.E.,  
Meridian, Magnetic Meridian, Magnetic Variation, V.L.,  
Section.
3. *Scales.*—R.F. : Primaries and Secondaries (choice of) : Selection of Scales : Construction of Scale from R.F. : Construction of Scale for an aeroplane map.
4. *Contours.*—Indicate nature of ground, indicate gradients, and whether convex, uniform or concave; differences in level; angle of sight found from contours; mutual visibility of points; road contours and gradients; contours and hachures, spot levels.  
(Illustrate contours by slicing a loaf of bread.)
5. *Conventional Signs.*—  
(a) English.  
(b) Foreign.
6. *Squaring of Maps.*—For location of positions.
7. *Practice in Map Reading.*—Care of Maps.
8. *Brief Hints on Sketches in the Field.*

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M. G. T. C.

No. 22 LECTURE.

USE OF COMPASS AND PROTRACTOR.

Lecture Notes.

1. *Protractors.*—

- (a) Various types of protractors described.
- (b) How to use them.

2. *Compasses.*—

- (1) Service compass.
- (2) Magnetic variation explained.
- (3) Description of *true* and magnetic bearings, and how shown on maps.
- (4) Conversion of one to the other, and *vice versa*.  
Diagram shown.

3. *Testing Accuracy of Compasses.*—

- (a) Taking three points on ground from a position which with the points taken is clearly marked on the map (large scale).
- (b) Post and plumbline method with the sun.

4. *Hints About Care of Compass.*—

- (1) Keep card fixed when not in use.
- (2) Never take bearings in vicinity of iron.

5. *Local Magnetic Variation.*

6. *How to Set a Map.*

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# M. G. T. C.

## No. 23 LECTURE.

### RESECTION WITH COMPASS AND USE OF TRAVERSING DIAL.

#### Lecture Notes.

1. Resection when it is required to find one's position on the map :—
  - (a) Three compass bearings with compass.
  - (b) Plotting of bearings found in (a) with protractor.
  - (c) Triangle of error.
  
2. Resection when it is required to find one's position on the ground :—
  - (a) Note on Map 2 magnetic bearings.
  - (b) Use of bearings found in (a) on ground.
  
3. *Use of Traversing Dial.*—
  - (a) Selection of reference object on map.
  - (b) Join reference object, gun position and target.
  - (c) Measure angle formed by lines drawn in (b).
  - (d) Lay gun on reference object and note reading on dial.
  - (e) Add or deduct angle found in (c) to or from reading on dial.
  - (f) Swing gun till pointer on dial gives required reading.
  - (g) Procedure when suitable reference object is available on ground, but cannot be identified on map.

Grantham, 20/5/16.

M. G. T. C.

No. 24 LECTURE.

**MACHINE GUNS IN TRENCH WARFARE,  
I.**

**(General Principles.)**

**Lecture Notes.**

- (1) Machine-guns peculiarly well adapted to this form of warfare.
- (2) Role of machine-guns.
- (3) General principles same as in open warfare.
- (4) Defended areas.
- (5) Responsibility for command.
- (6) Co-operation.
- (7) Taking over trenches :—
  - (a) Company Commanders' reconnaissance.
  - (b) Section Officers' reconnaissance.
  - (c) Reliefs between machine-gun companies.
  - (d) Reliefs within the companies.
  - (e) Reliefs of sentries.
- (8) Trench routine :—
  - (a) Depots.
  - (b) Distribution of men and ammunition.
  - (c) Essentials for successful holding of trenches.
    - (1) Efficiency and preparedness of guns, emplacements, &c.
    - (2) Prevention of ill-health staleness.

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M. G. T. C.

No. 25 LECTURE.

**MACHINE GUNS IN TRENCH WARFARE,  
II.**

**(General Principles.)**

**Lecture Notes.**

1. *Bombardments.*—
  - (a) Hostile.
  - (b) Friendly.
2. *Ammunition.*—
  - (a) In belt boxes.
  - (b) In S.A.A. boxes.
  - (c) Belt-filling.
  - (d) Ammunition reserves.
3. *Emplacements.*—
  - (a) Battle emplacements.
  - (b) Alternative emplacements.
  - (c) Protection to gun teams.
  - (d) Identification of emplacements.
  - (e) Limits of traverse.
  - (f) Loopholes.
4. *Control of Guns.*—
  - (a) Position of Section Commander.
  - (b) Communication.
5. *Painting of Guns.*
6. *Periscopes.*
7. *Position of Guns, and Depot known to all men in a Section.*
8. *Firing without Tripods.*
9. *Shovels and Very Pistols.*
10. *Bombers.*
11. *Orders Boards.*
12. *Gas Attacks.*
13. *Enemy Machine-Guns.*
14. *Subsidiary Lines of Trenches.*

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No. 26 LECTURE.

**MACHINE GUNS IN TRENCH WARFARE,  
III.  
(The Defence.)**

**Lecture Notes.**

**1. Distribution of Guns in a Sector of Trenches.—**

- (a) Main position of defence.
- (b) The front system.
- (c) The support system.

**2. Siting of Guns.—**

- (a) Oblique fire.
- (b) Depth of field of fire.

**3. Duties other than Creating Bell of Fire.—**

- (a) Enfilade own trenches.
- (b) Co-operation with bombers.
- (c) Sweeping ground in rear of enemy's line.
- (d) Holding isolated strong points.
- (e) Engaging hostile machine-guns.
- (f) Duties in reserve.

**4. Defensive Flanks.—**

No position is captured until every machine-gun is silenced. Therefore a machine-gun once allotted to a definite position of defence will never abandon that position.

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No. 27 LECTURE.

**MACHINE GUNS IN TRENCH WARFARE,  
IV.**

**(The Attack.)**

**Lecture Notes.**

1. *Points in which the Attack in Trench Warfare differs from that in Open Warfare.*
2. *Necessity for Careful Rehearsal and Comprehensive Orders.*
3. *Principles of Attack in Open Warfare hold good in Trench Warfare.*
4. *Modifications and Additions.—*
  - (a) Reconnaissance.
  - (b) Allotment of positions to guns.
  - (c) Distribution of guns.
5. *Covering the Infantry Advance.—*
  - (a) Firing on enemy's parapet.
  - (b) Keep down fire from flanks.
  - (c) Sweep ground behind enemy's lines.
  - (d) Help our infantry out of trenches.
  - (e) Engage hostile flank attacks.
  - (f) If attack fails, keep down fire.
6. *Going Forward to Consolidate Positions.—*
  - (a) Necessity for previous selection of important tactical points.
  - (b) Danger of moving forward too soon.
7. *In Reserve.—*
  - (a) A reserve of fire power at disposal of Brigadier.
  - (b) Long-range firing, if required.
8. *Ammunition Supply.—*
  - (a) Officer in charge of arrangements.
  - (b) Careful selection of routes from rear to Section Depots.
  - (c) Arrangements with R.E. for a system of bridges to facilitate passage of transport.
9. *Position of Company Commander.—*  
With the Brigadier.

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M. G. T. C.

No. 28 LECTURE.

LONG RANGE SEARCHING FIRE.

Lecture Notes.

1. *Value of.*—

- (a) With observation.
- (b) Without observation.

2. *Officers must be thoroughly Conversant with all Factors.*

3. *Rules to Ensure Safety of Friendly Troops.*

4. *Necessity for Finding Exact Position of Gun.*—(For method see Lecture 23.)

5. *Practical Points.*—

- (a) Deciding on area to engage.
- (b) Number of guns to employ.
- (c) Advantages of dispersing guns.
- (d) Provision of emplacements and dug-outs.
- (e) Arrangements necessary if guns placed outside brigade area.

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# M. G. T. C.

## No. 29 LECTURE.

### CHARACTERISTICS OF LEWIS GUNS.

#### Lecture Notes.

1. *Mobile.*—

Due to weight.

Deduction :—

Can be carried by one man.

2. *Inconspicuous.*—

Carried like a rifle by means of sling.

Deduction :—

Guns can go forward with a line of infantry without attracting attention.

3. *Capable of Producing an Intense and Accurate Volume of Fire at a Moment's Notice.*—

(a) Carried fully loaded.

(b) Fires at rate of 700 rounds per minute.

Deductions :—

(a) Supplement fire power of rifles.

(b) Closely support infantry.

4. *Absence of Fixed Mounting.*—

Subject to "nerves" of firer.

Deductions :—

(a) Unsuitable for overhead or long-range searching fire.

(b) Cannot be relied on for "belt" of fire.

5. *Construction and Liability to Overheat.*—

(a) Small magazine capacity.

(b) Large number of magazines required.

(c) Mechanism of light construction.

(d) Air-cooled.

Deductions :—

(a) Frequent reloading necessary.

(b) Can only be fired for short periods.

(c) Highly organised ammunition supply necessary.

Summary.—

- (1) Lewis gun a mean between machine-gun and rifle fire.
- (2) Demands elaborately organised ammunition supply.
- (3) Fire power for short periods same as machine-gun.
- (4) More mobile than machine-guns.
- (5) Personal factor present.
- (6) Tactics simple.
- (7) Supplementary to and not a substitute for machine-guns.

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M. G. T. C.

No. 30 LECTURE.

HINTS TO OFFICERS PROCEEDING  
ON ACTIVE SERVICE.

Lecture Notes.

1. *Travelling.*—
  - (a) By train.
  - (b) By road.
2. *Billets.*
3. *Sleeping in the Open.*
4. *Games and Entertainments.*
5. *Interior Economy.*—
  - (a) Rations.
  - (b) Water.
  - (c) Equipment.
  - (d) Ammunition.
  - (e) Pay.
  - (f) Punishments.
6. *Sanitation.*—
  - (a) Duties of R.A.M.C. orderlies.
  - (b) Duties of officers and men.
  - (c) Flies.
7. *Discipline.*
8. *Fermin.*
9. *Bathing Arrangements.*—
  - (a) Divisional baths.
  - (b) Improvised baths.
  - (c) Bathing paradises.
10. *Inspections.*—
  - (a) Feet.
  - (b) Iron rations.
  - (c) Field dressings.
  - (d) Kit.
  - (e) Gas helmets.

11. Relations with Other Arms.—

- (a) Infantry.
- (b) Artillery.
- (c) Royal Engineers.
- (d) Brigade Headquarters.
- (e) Army Service Corps.
- (f) Divisional and Staff Officers generally.

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