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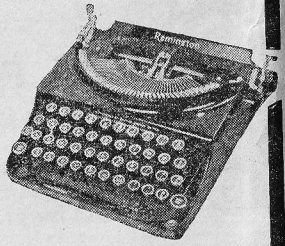

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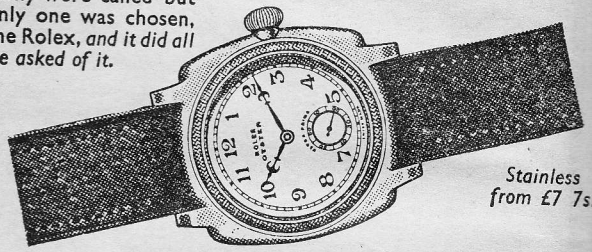

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VOL. II

OPERATIONS—GENERAL

1935

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n 3. *For* "Cavalry and mounted rifles" *substitute* avalry, mounted rifles and scouts".

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THE ARRANGEMENT OF TRAINING MANUALS

1. The training manuals of the Army are divided into :—

i. Those common to all arms.
ii. Those dealing with one arm only.

The former are bound in red, the latter in a distinctive colour for each arm.

Table I, below, shows briefly what subject matter is dealt with in the volumes common to all arms.

Table II gives a list of the principal manuals of each arm.

2. The manuals of the various arms are arranged as follows :—

i. One volume deals with the training of the arm in peace and its employment in war ; * these volumes are based on, and supplement, Field Service Regulations, Volume II,† and Training Regulations, and are supplemented as necessary by :
ii. Volumes dealing with special subjects which concern an individual arm alone (e.g. Artillery Training, Volume II (Gunnery)).

Further details are contained in the prefaces to the manuals of each arm.

3. The scales of issue within units of all manuals are contained in the publication "Manuals, Regulations, etc., Authorized Scales of Issue."

* These volumes will be issued in 1936, except R.A.S.C. Training, of which Volumes I and II will be amalgamated on next revision.
† R.A.S.C. Training is based principally on F.S.R., Volume I.

TABLE I

MANUALS COMMON TO ALL ARMS

Serial No.	Title (*a*)	Nature of contents (*b*)
1	*Part I.—Regulations.* Field Service Regulations : Vol. I (Organization and Administration).	The principles of organization of the Army ; organization and duties of the staff ; the maintenance of the army in the field.
2	Vol. II (Operations—General).	The tactical principles governing the employment of all arms in co-operation, and all information regarding each arm that officers of other arms should possess.
3	Vol. III (Operations—Higher Formations).	The principles governing the employment of armed forces in war, and the tactical employment of larger formations.
4	Training Regulations.	The principles, organization and conduct of training, preparation and conduct of exercises ; umpiring.
	Part II.—Manuals Dealing with Special Subjects.	
5	Employment of Air Forces with the Army in the Field.	The characteristics, roles, and employment of aircraft, orders for air action, liaison and intercommunication between the Army and Air Force.
6	Manual of Anti-Aircraft Defence (Army Units), Vol. II.	Deals only with measures necessary for the defence of areas against aircraft directly attacking objects in or covered by those areas.
7	Manual of Movement (War).	The characteristics, control, and utilization of transportation resources, organization of the overseas base, movements to, and in, the theatre of war.
8	Defence against Gas.	Types of gases and gas attacks, individual and collective protection, and unit training.
9	Manual of Military Intelligence. (For Official Use Only.)	The organization and conduct of intelligence duties with an army in the field.
10	Manual of Field Engineering, Vol. I. (All Arms.)	Particulars of field engineering for which units of all arms are responsible.

TABLE I—*continued*

Serial No.	Title (*a*)	Nature of Contents (*b*)
11	Manual of Operations on the North-West Frontier of India.*	—
12	Signal Training. (All Arms.)	The individual training of signallers of all arms and collective training of regimental signallers.
13	Manual of Ceremonial.	Ceremonial drill of all arms, excluding guards and sentries.
14	Manual of Elementary Drill. (All Arms.)	Dismounted drill, so far as it is common to all arms; guards and sentries; march discipline.
15	Small Arms Training : Vol. I. ,, II. ,, III. ,, IV. ,, V.	The rifle, bayonet, and revolver. The light machine gun, grenade and small arms, anti-aircraft. The ·303-in. Vickers machine gun. The conduct of annual courses and range practices. Range regulations.
16	Field Service Pocket Book.	A compilation of information contained in various manuals, and other useful data to which reference may be necessary in the field.
17	Manual of Horsemastership, Equitation, and Driving.	—
18	Manual of Driving and Maintenance of Mechanical Vehicles (wheeled).	—
19	Animal Management.	The care, feeding, etc., of animals of all types, prevention and treatment of diseases, etc.
20	Manual of Map Reading, Photo Reading, and Field Sketching.	—
21	Notes on Map Reading.	Reproduces Part I of Serial No. 20.
22	Manual of Physical Training.	—
23	Educational Training.	The organization of educational training in units, details of certificates of education, particulars of army educational establishments.
24	Army Manual of Hygiene and Sanitation.	Instructions for the preservation of health and the prevention of disease, for water purification, etc.

* Published by Army Headquarters, India.

TABLE II

MANUALS OF THE VARIOUS ARMS

Serial No.	Title (*a*)	Nature of Contents (*b*)
	CAVALRY	
1	Cavalry Training.	The training, leading and employment of cavalry.
2	Ditto (Supplement).	The training and tactical handling of armoured cars.
3	Cavalry Section Leading.	A guide for non-commissioned officers and troopers as leaders of sections.
	ROYAL ARTILLERY	
4	Manual of Anti-Aircraft Defence (Army Units), Vol. I, Part I (Gunnery).	The principles of gunnery as applied to A.A. defence.
5	Manual of Artillery Survey.	The application of survey to artillery work.
6	Artillery Training : Vol. I.	The training, leading and employment of artillery.
7	,, II.	Gunnery.
8	Coast Artillery Training : Vol. I.	Organization and training of R.A. coast defence units.
9	,, II	Equipment and material of R.A. coast defence units.
	ROYAL ENGINEERS	
10	Manual of Anti-Aircraft Defence (Army Units), Vol. I, Part II.	The training and duties of anti-aircraft searchlight units.
11	Regulations for Engineer Services.	Organization and duties of personnel employed on works services (peace).
12	Engineer Training.	The training, leading and employment of engineers.
13	Manual of Field Engineering, Vol. II (Royal Engineers).	Engineering work for which engineers only are responsible.
	Manual of Military Engineering :	
14	Vol. II.	Defences.
15	,, III.— Part I. Part II.	Bridging. General principles and materials. Pamphlets on equipments.
16	Vol. IV.	Demolitions and mining.
17	,, V.	Roads.

TABLE II—*continued*

Serial No.	Title (*a*)	Nature of Contents (*b*)
	ROYAL ENGINEERS—*continued*	
18	Vol. VI.	Water supply.
19	„ VII.	Accommodation and installations.
20	„ VIII.	Railways.
	ROYAL CORPS OF SIGNALS	
21	Signal Training. Vol. I.	The higher organization of intercommunication in the field. The handling of units of the Royal Corps of Signals.
22	„ II.	A handbook of electricity and magnetism, leading up to their technical application to intercommunication in the field.
23	„ III.	Handbooks of individual sets of electrical and signalling apparatus.
24	„ IV.	Line construction and maintenance for individual and unit training in the Royal Corps of Signals.
25	„ V. (For official use only.)	Signal office organization and routine. W/T and L/T procedure for the Royal Corps of Signals.
	INFANTRY	
26	Infantry Training.	The training, leading and employment of infantry.
27	Infantry Section Leading.	A guide for non-commissioned officers and men as leaders of sections.
	ROYAL TANK CORPS	
28	Tank Training. Vol. I.	The training, leading and employment of tanks.
29	„ II.	Technical training.
	ROYAL ARMY SERVICE CORPS	
30	R.A.S.C. Training. Vol. I.	Training and drill.
31	„ II.	The employment of R.A.S.C. in war.
32	„ III.	Supplies.
33	„ IV.	Animal transport.
34	Regulations for Supply, Transport and Barrack Services.	—

FIELD SERVICE REGULATIONS

VOLUME II

OPERATIONS—GENERAL

1935

CHAPTER I

FIGHTING TROOPS—THEIR CHARACTERISTICS AND ARMAMENT

1. General principles of co-operation

1. This manual is intended as a guide to the principles by which all parts of an army work in combination. As a first step to proper combination, all commanders must understand the characteristics and limitations of the various arms which are given below; they must also have a thorough grasp of the general principles of supply and maintenance work in the field, which are laid down in Field Service Regulations, Volume I.

2. The fighting arms consist: firstly, of those whose primary role is to close with the enemy, to seize and occupy points of advantage, or to defend them; and secondly, of those whose main function is to support their action. The former include armoured troops, cavalry and infantry; the latter, artillery, engineers and signals. Armoured troops are mounted in battle, i.e. fight from their vehicles; while infantry fight on foot, whatever means they may employ to reach the battlefield. Cavalry may fight either

mounted or dismounted. Which of the arms, or what combination of them, is employed to attain any particular objective depends on a variety of considerations, of which the principal are the ground, the quality of the enemy and the time factor. The supporting arms—artillery, engineers and signals—can obtain decisive results in battle only in combination with the other arms; while without their aid armoured troops, cavalry and infantry have only a limited power of action.

3. The importance of aircraft in land warfare is ever increasing. The information to be obtained from air reconnaissance is essential to any army in the field, while the offensive action of air units against targets on the ground may have far-reaching and often decisive results. But offensive action from the air depends for success on the establishment and safeguarding of suitable bases within striking distance of the enemy. An army may be required to secure bases from which aircraft can operate, or to attack the bases from which enemy aircraft are operating. The army is always responsible for protecting aircraft establishments on the ground.

The principles on which an air force co-operates with an army in the field are outlined in Sec. **8, 1**, and are given in detail in the manual Employment of Air Forces with the Army in the Field.

2. Armoured troops

1. The armoured fighting vehicles in the service consist of tanks and armoured cars: tanks move by means of tracks, armoured cars on wheels with tyres. Details of the speed, weight, armament, etc., of the principal types are given in Appendix I. Since armour cannot give complete protection, all armoured troops will depend for success largely on surprise and on their speed in action.

Tanks

2. Tanks have a considerable cross-country capacity, can break down or cross wire entanglements, and combine a high degree of protection for their crews (against the fire of rifles and machine guns) with great mobility and the power to deliver a considerable volume of aimed fire while in

movement. These characteristics make armoured units formidable in attack and give them an important moral effect against unarmoured troops. They are also less vulnerable to air and gas attack than other troops. On the other hand, tanks are vulnerable to the fire of artillery and special anti-tank weapons; and are very sensitive to ground, since a steep uphill slope materially reduces their speed, thus making them an easier target, and a water obstacle with a depth of more than a few feet (*see* Appendix I), a deep cutting, a thick wood, swampy ground, a rocky hill, and trenches of more than a certain width, or specially dug obstacles, will stop them. Their distinctive appearance renders them easily recognizable both to ground and air observers, their tracks are visible from the air in most types of country, and the characteristic noise made by the larger types gives warning of their approach. When they are closed down for action, the field of vision of the crews is limited, and the strain on them caused by the uneven movement and by the noise is severe.

3. Tanks are designed either to take part in mobile operations, for which speed and a wide circuit of action are essential at some sacrifice of armoured protection; or for close co-operation with infantry in the attack, for which armour is of more importance than speed or a wide circuit.

Tanks of the former type are classified either as light or medium, are equipped with wireless for purposes of control and communication, and are organized into *mixed* and *light* tank battalions; those of the latter are called infantry tanks, and are organized into *army* tank battalions.

Mixed tank battalions are organized into companies containing medium, light and close-support tanks. The medium tank is the principal assault weapon. The light tanks protect the medium tanks by reconnaissance and by the neutralization of anti-tank weapons. Close-support tanks differ from medium tanks only in having, instead of a 3-pr. gun, a howitzer, which throws a smoke or H.E. shell: their normal role is the protection of the medium and light tanks by placing a smoke screen between them and any anti-tank weapons which open fire unexpectedly during the course of an action: they carry also a small proportion of H.E. shell for their mortars for use in an attack on buildings, or on other special occasions.

Light tank battalions consist entirely of light tanks; they

are normally used in co-operation with mixed tank battalions, when their principal role is to reconnoitre the enemy and to neutralize his anti-tank weapons in preparation for the action of the mixed battalions.

Mixed and light tank battalions can cover fifty miles a day without undue fatigue, at an average pace of seven to eight miles an hour.

4. Mixed and light tank battalions are normally organized into *tank brigades*. A tank brigade will usually be included with other mechanized formations in a *mobile division*, of which it will form the main striking portion for decisive action, while the principal roles of the remainder of the division will be reconnaisance, protection, the passage of obstacles, the support by fire of the attack of the tank brigade and action in terrain unsuited for tanks. The wide range of action and the mobility of tank brigades, greater than any troops have ever before possessed, give them frequent opportunities for surprise, and enable them to strike a blow not only at the flanks of an enemy but also at his headquarters and rear services. Even the mere threat of their attack may paralyse or hamper enemy movement by compelling him to employ an undue proportion of his force in the protection of his flanks and rear. Their range and mobility is, however, limited by the endurance of the crews and of the machines, as well as by the supply of petrol and oil. Armoured troops cannot move at all when their supplies of petrol fail, whereas horses can continue to move for a time on short rations or even without food. Armoured units alone, owing to the small man power available, cannot hold ground, but they can by manœuvre deny to the enemy an area of ground for a short period; they are thus of great value for delaying action in a withdrawal. They normally require protection by other troops when at rest.

5. *Army tank battalions* are equipped with heavily armoured tanks, which are somewhat slower than medium tanks; they are also provided with a small number of light tanks for purposes of control and intercommunication within the battalion. Army tank battalions are intended for close co-operation with infantry in the attack and counter-attack. They are required to break down wire entanglements and to destroy or neutralize machine guns. They are a valuable aid to gaining the advantages of surprise and initial success in the attack and to maintaining its momentum. They also

provide a most efficient means of countering hostile tanks. Their success will depend on the choice of suitable ground, on the concealment of their assembly and approach, and on the co-operation of other arms in giving early warning of the existence of tank obstacles and in neutralizing the fire of hostile anti-tank weapons.

Armoured Cars

6. Armoured cars have a greater speed on the road or over level ground than have tanks, and are as silent in movement as an ordinary motor car. Their cross-country capacity is considerable over open country, but they have only a limited ability to surmount obstacles and are therefore mainly of use in areas well provided with roads, or in open plains or deserts with a hard surface. They are organized into regiments or independent companies. Their principal role is long-distance reconnaissance, in which they frequently work in conjunction with cavalry. They are also valuable for escorting convoys and for similar protective work; but as the demand for these latter tasks will be heavy in war, and the supply of armoured cars limited, it is likely to be met in part at least by armoured cars improvised from commercial vehicles.

3. Cavalry ~~and~~ mounted rifles and Scouts

1. The principal attribute of the horse-soldier is his mobility. But mobility is a relative quality only. Thus with forces and columns moving at the marching soldier's pace the mobility of cavalry gives it great value for reconnaissance, protective duties or special missions; with mechanized forces (e.g. armoured forces and infantry in motor transport) where the ground is favourable to mechanical movement cavalry is likely to be outpaced.

Cavalry, though less mobile than armoured troops in areas favourable to the movement of mechanical vehicles, is much less sensitive to ground and can go practically anywhere; it can thus work in many regions (e.g. mountainous country, thickly wooded areas, ground intersected with water obstacles) in which armoured forces would be useless. It has a greater power of dispersion, and therefore of detailed reconnaissance, than armoured troops.

It is of course more vulnerable than armoured troops to

2. Page 5. Section 3. *For* heading *substitute* :—

"Cavalry, mounted rifles and scouts."

C 2

3. Page 6. Section 3. *Add* new paragraph :—

6. A scout regiment is composed of skilled mounted observers and its rôle is to carry out such special observation and reconnaissance as is required, either with or without the protection of other troops. Its equipment is designed to enable it to carry out its rôle in country unsuited to normal mounted troops.

fire both from the ground and from the air and to gas attack. The concealment and protection of the horses of large bodies of cavalry from air attack is of great importance and presents serious difficulties.

The average length of march for bodies of cavalry may be taken as twenty-five to thirty miles a day, and the rate of movement as five to six miles an hour.

2. The armament of the individual cavalryman is the rifle for use dismounted and the sword for mounted attack. To support either form of action cavalry units are equipped with light machine guns; and a proportion of artillery normally accompanies all cavalry formations of a brigade or higher.

The only distinction between cavalry and mounted rifles is that the latter carry no sword, and are thus not equipped for shock tactics. There are, however, instances in recent wars of mounted rifles using their mobility to make successful mounted attacks.

3. Owing to the necessity of leaving men with the le horses (normally, one to four horses) cavalry can only emplo a limited proportion of its strength in dismounted actio Thus a regiment dismounted is equivalent in fire power t about two companies of infantry. A force of cavalry in di mounted action can often compensate for its comparativ weakness in numbers by surprise and by the power whic its mobility gives to change ground rapidly or to withdraw Since it is not usually required to push home an attack or to make a protracted resistance, it can be disposed on a wider front and in less depth than an infantry force of the same size.

4. Cavalry is provided, in country suitable for their use, with a number of light motor cars or motor cycles for intercommunication and to enable it to send back rapidly the information it secures by reconnaissance, which is normally its principal role. Armoured cars often work closely in co-operation with cavalry in the service of reconnaissance.

5. To sum up, the main duties of cavalry are reconnaissance and protection; in battle they may be used to delay the enemy, to safeguard a flank, to form a mobile reserve, to carry out a pursuit, or to cover a withdrawal; they may also be despatched on a special mission, such as a raid.

3. Page 6. Section 3. *Add* new paragraph :—

6. A scout regiment is composed of skilled mounted observers and its rôle is to carry out such special observation and reconnaissance as is required, either with or without the protection of other troops. Its equipment is designed to enable it to carry out its rôle in country unsuited to normal mounted troops.

Amdt. 2
May, 1937

4. Infantry

1. Practically all success in war, which is won by the proper co-operation of all arms, must in the end be confirmed by infantry, which, by closing with the enemy, compels his withdrawal or surrender, and holds the objectives which have been secured or the points of importance which have to be protected, as a base for further action. It is the most adaptable and the most generally useful of all arms, since it is capable of operating over almost any ground either by day or by night and can find or make cover for itself more readily than the other arms.

2. The movement of bodies of infantry on foot is slow and their range limited. Infantry which can be carried to the battlefield in mechanical transport will obviously secure a great advantage in freshness and vigour besides an increase in range. The mobility of infantry in battle can be increased by arrangements for lightening its load. Small bodies of infantry may be transported by aircraft, but will have little mobility on arrival at the scene of action unless first-line transport for them can be improvised locally. Movements of infantry by mechanical transport or by air are further discussed in Chapter III.

In a well-roaded country, cycles are sometimes useful for giving mobility to small bodies of infantry. Cyclists can keep up with cavalry units or formations if the roads are good, and may sometimes be used in the support of cavalry or to replace them, if mounted men are not available. They can develop their full fire power when dismounted, since no cycle holders are required: they must, however, return to their cycles after an action, unless these can be brought up by a lorry. Machine guns for the support of cyclists may be carried in mechanical transport.

3. Infantry units or formations are organized in two echelons, an echelon of riflemen and an echelon of supporting fire for these riflemen. The principal weapons of the echelon of riflemen are the light machine gun, rifle and bayonet. Infantry units also carry a supply of smoke and H.E. grenades, to be fired from the rifle or thrown by hand, which are issued to the riflemen when likely to be required. In defence or in consolidation, the use of the spade and pick is a most important factor in enhancing the power of the individual soldier-man. The supporting echelon is equipped with

machine guns and mortars, and may also include anti-tank weapons, if armoured fighting vehicles are likely to be met. These supporting weapons are carried in unarmoured vehicles, which may be horsed or mechanically drawn. The range and characteristics of infantry weapons are given in Appendix II.

4. On the battlefield, the volume of fire that its weapons can develop, and the ease with which it finds cover and concealment, make infantry very strong in defence, especially if the infantryman is well trained in the use of ground and entrenching tools and in the erection of barbed wire obstacles. On the other hand, against the fire of modern weapons and the hindrance of barbed wire entanglements infantry is relatively weak in the attack; since it is very vulnerable without cover and during movement and has no weapons of its own to break down wire obstacles. For success in the attack it depends on the skilful use of ground to secure surprise, or the cloak of darkness or smoke to conceal its advance, and on artillery fire or the aid of tanks to break a passage through wire, if necessary, and to reduce the fire power and morale of the enemy. In favourable conditions, e.g. against an enemy of poor morale or with a low standard of armament, when the opposition is unorganized and the ground offers a concealed approach, or when the enemy has been induced to exhaust his strength by attack on selected and prepared positions, a skilful and enterprising infantry may advance under cover of its own weapons. At the other extreme, in position warfare, infantry may be powerless to make ground without a very heavy concentration of artillery fire, or the co-operation of large numbers of tanks; its action may in fact be confined mainly to occupying areas in which other arms have pulverized enemy resistance. Between these two extremes there will be many degrees. Much will depend on the training of the infantryman and on his leaders; to take advantage of ground and opportunity in the attack requires a very high standard of training and resourcefulness and a mobility which only physical fitness and a light equipment can give.

5. So many factors may affect the frontages allotted to infantry units that they cannot be made the subject of rules. *As a very rough general guide* a battalion in the attack or defence may be taken to occupy about 1,000 yards of front and approximately the same in depth.

5. Artillery

1. Artillery in the field is classified as mountain (in India only), horse, field, anti-aircraft, medium, heavy and super-heavy. All these except heavy and super-heavy have the mobility to march and manœuvre with a division. Anti-aircraft, medium, heavy and super-heavy artillery are mechanically drawn; the remainder may be mechanically or horse drawn. Mountain artillery is carried on pack.

Artillery is normally allotted as follows: horse artillery accompanies cavalry brigades; a proportion of the field artillery forms the *divisional artillery;* the remainder is organized into *army field brigades* which are retained under higher commanders; medium, heavy and super-heavy are under corps or army control, but a proportion of medium artillery is sometimes allotted to divisions; anti-aircraft artillery is usually under army control.

2. Artillery, unlike other arms, is not fully committed once it has become engaged with the enemy, but retains, in great measure, its liberty of action. Without change of position, its fire can be concentrated or dispersed at will, at varying degrees of intensity, on widely separated targets. Artillery can be disengaged from the combat and brought into action in other parts of the battlefield with greater facility than any other arm. This flexibility of artillery fire is a factor to be exploited in the plan made to deceive and surprise the enemy as to the area in which it is intended to attack.

To obtain full advantage from these characteristics, the artillery in the field should be so organized and distributed that its main power can be rapidly applied at points where decisive blows are to be struck; and the system of command should be arranged to allow of centralization or decentralization of control according to the situation.

Artillery can be used with more effect and greater economy if kept under one command. Thus command of any body of artillery should be centralized under the highest commander who can exercise effective control. This will vary in different phases of the battle, according to the signal communications available. Whenever artillery is decentralized, it must be clearly stated in orders whether it is allotted to "support" the formation or unit concerned, command being retained by the higher formation, or is placed "under the command of" the formation or unit to which it is sub-allotted. In the former event, artillery provides

the fire required by the formation or unit which it is detailed to support so long as it is not called upon by the higher commander for other tasks; in the latter, it is controlled entirely by the commander under whom it is placed.

3. The development of the full powers of the artillery may be subject to the following limitations :—

i. Difficulties of observation and of communicating fire orders to the guns in close country.
ii. The capacity for expending ammunition faster than it can be replaced.
iii. Physical exhaustion of artillery personnel caused by constant firing and by man-handling ammunition.
iv. Overheating of guns during rapid firing.
v. Exhaustion of horseflesh and the possibility of mechanical break-down, particularly in difficult country.
vi. The time required to obtain data for predicted shooting (*see* para. **7**, below).

4. Artillery weapons are guns or howitzers. Guns have a high muzzle velocity which gives them a long range but involves a comparatively flat trajectory; howitzers have a comparatively low muzzle velocity and a high trajectory. The respective advantages and disadvantages of guns and howitzers are similar to those of the infantry support weapons —machine guns and mortars. The gun has a longer range and a more rapid rate of fire than a howitzer of corresponding classification; the howitzer has a greater shell power and the ability to search ground behind cover, which guns, owing to their flat trajectory, cannot reach. Howitzers can be brought into action almost anywhere, e.g. directly behind steep ground, buildings, or woods: positions for guns are much harder to find, since it is necessary to ensure that their flat trajectory will clear the crest of any high ground or obstacle between gun and target (this factor is known as " crest clearance ").

Details of guns and howitzers are given in Appendix III.

5. The types of shell used are H.E., " carrier " (which may contain smoke, incendiary or other material), and shrapnel. H.E. shell is fired by all natures of artillery, with instantaneous or graze fuze, with delay fuze (heavy howitzers only) or with time fuze (anti-aircraft guns only). It is the most generally useful shell for the destruction of personnel, entrenchments, buildings or cover of any description. Smoke shell is fired by horse, mountain and field artillery, to

deny observation to the enemy and to screen the movements of our own troops (*see also* Sec. **9**).

Shrapnel, with a time fuze, is fired by guns of anti-aircraft, field, medium and heavy artillery, and by howitzers of horse and mountain artillery. It is effective against troops in the open, particularly so when fired in enfilade, owing to its forward effect. To burst time shrapnel correctly requires, however, good observation and a high standard of training. Shrapnel bursting on percussion is also effective against armoured fighting vehicles.

The proportion of each form of shell carried in the field by the various types of artillery is given in Appendix III.

6. The methods by which artillery support the action of the other arms may be summarized as follows :—

In the attack—

i. *Artillery preparation*—i.e., fire which is intended to damage the enemy's defensive organization, to inflict losses on him and to impair his morale, prior to assault by our own troops: its duration and intensity will depend upon the strength of the enemy's position and the importance attached to surprise.

ii. *Covering fire*—i.e., fire which is put down while our troops are moving to the assault: it may take the form of a " barrage," or belt of fire, moving ahead of the advancing troops; or of " concentrations " in which the fire of a number of guns is concentrated on particular targets or localities in succession; or of smoke screens; or of a combination of any or all of the above (their advantages and disadvantages are discussed in Sec. **63**). A proportion of the supporting artillery may sometimes be placed directly under the commanders of the leading units, in order to enable them to deal quickly with opposition which the pre-arranged covering fire has failed to overcome; or with special targets, such as a building, against which their own weapons have proved ineffective.

iii. *Counter-battery fire*—i.e., fire which is intended to neutralize or destroy enemy artillery; it is usually carried out by medium or heavy artillery with air observation.

iv. *Harassing fire*, employed to hinder the conduct of the defence, and to reduce the morale of the defenders by preventing or hampering movements of reinforcements, food and ammunition to the front.

In the defence—

v. *Counter-preparation*—i.e., fire directed on the enemy's forming-up places and forward communications, so as to disorganize and, if possible, break up an attack which appears to be imminent.

vi. *Defensive fire*, used against troops actually attacking. It is usually put down on pre-arranged areas in co-ordination with the fire of other weapons, especially of machine guns, and is fired on a pre-arranged signal. If the enemy can be actually seen attacking, they will be engaged with defensive fire by all batteries whose observers can see them, although the pre-arranged signal may not have been given.

vii. *Anti-tank defence*, to provide a second line of fire if armoured fighting vehicles break through the front line. In certain circumstances field guns may be placed in or near the front line with a primary role of anti-tank defence.

viii. *Counter-battery fire* and *harassing fire*, with similar objects to those of such fire in the attack.

The artillery will also always be prepared to support counter-attacks.

7. Artillery is normally dependent for fire effect on observation of the target; but targets once "registered" (i.e. ranged on by actual shooting) can be engaged with a reasonable degree of accuracy without further observation. In certain conditions, when the positions of the guns and of the targets have been exactly determined by survey, or when large scale maps are available, artillery can open accurate fire without observation or previous registration, and can thus obtain surprise effect; this is known as predicted shooting. Since survey work takes time, the relative importance of speed or secrecy must be taken into account in deciding whether to open with registered or predicted fire. In shooting either by previous registration or by prediction, observation is desirable to enable errors to be corrected.

Since artillery is normally placed in indirect positions, i.e. out of sight of its targets, observation must generally be carried out at some distance from the guns. The selection of

posts for observation (O.Ps.) and the establishing of communication between the O.Ps. and the guns is often the determining factor in the time taken by artillery to open fire. Observation by aeroplane is usual when ground observation is not possible or is difficult, especially for counter-battery work or long-range fire. Fire over open sights, when the target is visible from the gun, is seldom used except against an enemy who has overrun the forward troops.

8. The rates of artillery fire are given in Appendix III. Since all the ammunition carried in forward echelons can be very quickly expended by a rapid rate of fire, expenditure must always be carefully considered in allotting tasks to artillery. For example, barrages are usually fired at an average rate of 3 to 4 rounds a gun a minute: thus a barrage to support an infantry attack to a depth of 1,500 yards might last 35 to 40 minutes and require an expenditure of about 120 rounds by each 18-pr. gun. Concentrations or defensive fire or counter-preparation, which do not last so long as barrages, may be fired at a more rapid rate of fire for a short time.

9. *Anti-aircraft artillery* is employed to protect important points on lines of communication, in rear areas and in areas occupied by the fighting troops (*see* Sec. 38), the immediate protection of troops against low-flying aircraft being carried out by the troops themselves, and by the anti-aircraft machine-gun batteries, where available (*see* Sec. 38, 3). Anti-aircraft guns, being rapid-firing weapons with a flat trajectory, can in an emergency be effectively used against armoured fighting vehicles.

6. Engineers

1. Military engineers are technically trained and equipped to apply engineering science and skill to the needs of an army. They are also trained to fight as infantry, but are not equipped with automatic weapons other than for anti-aircraft defence. They should only be employed as infantry as a last resort, since casualties in skilled personnel are difficult to replace.

2. Simple engineering work in the field is the duty of all arms. This includes the siting and construction of simple protective works and obstacles, the clearing of the field of fire, elementary camouflage, assault bridging and the improvement of communications. In such work, which is within the

competence of other arms, the use of the engineers should be confined to advice, to minor assistance in technical details and to the provision of materials when necessary; unless, in the opinion of the commander concerned, the urgency of the situation necessitates their employment on the simpler engineering work, which other arms normally do themselves.

The proper sphere of engineers is in technical work, for which they alone have the proper training and the necessary equipment and tools. In the forward areas this may include bridging; demolitions; anti-tank obstacles; preparation of buildings for defence; the construction of heavily-protected or mined emplacements and shelters or of special defensive works; the development of water supplies; the construction, improvement and maintenance of roads or tracks; the construction and working of light railways; and survey work. Engineers in the forward area have a special scale of anti-gas equipment, to enable them to work on demolitions or areas contaminated with gas.

In the rear areas, engineers may be called on to undertake work such as the preparation of defences using civilian labour; the construction of buildings; the organization of workshops; electrical work; the operation of inland waterways; and the maintenance and operation of railways and docks.

3. The rapid and efficient solution of engineer problem demands foresight in reconnaissance and in the provision o tools, transport, materials and labour, both skilled an unskilled. It is necessary for commanders to keep thei senior engineer officers in close touch with the anticipate development of future events, in order that advice in engi neering matters may be given and preliminary arrangement be made in good time.

Engineer reconnaissance parties usually accompany the forward troops. It is also the duty of the other arms to provide early information and details of engineer tasks to the engineers, so that they may be enabled to start on their task with the least delay.

4. Engineer units allotted to fighting formations consist of *field squadrons* (allotted to cavalry divisions) and *field companies* and *field park companies* (allotted to divisions). Searchlights in air defence formations are operated by engineer units.

Field squadrons are organized into troops, all personnel

1. Page 14. Section 6, paragraph 3.—*Insert* the following as the second sub-paragraph :—

In addition to initiating reconnaissance for specific operations, it is the duty of the engineers, in co-operation with the general staff, to collect all available information of an engineer character or of engineer importance, both as regards the area occupied by the enemy and as regards the sector of the formation concerned.

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being carried in mechanical transport, except for small mounted parties for reconnaissance duties. Field companies and field park companies are organized into sections; their first-line transport is mechanized—and some mechanical transport is provided for the engineers of a division, which enables a proportion of the personnel of these companies to be moved rapidly with their first-line transport.

The engineer work behind the forward formations is carried out by *army troops companies, electrical and mechanical companies* and various workshop and other units. Such companies, particularly army troops companies, though less mobile than field units, may, if the situation requires, be allotted work in the forward area of a similar nature to that undertaken by field units.

7. Signals

1. It is the duty of the signals to provide means of intercommunication, other than postal, for an army in the field down to the headquarters of regiments, batteries and battalions. Within the units intercommunication is carried out by unit signallers and orderlies; but, where wireless communication is employed by the unit, the sets are maintained, and in some units are operated, by signal personnel.

2. Signal units are allotted to divisions, tank brigades, air defence brigades, and to all higher formations, and to the lines of communication area. The principles of intercommunication and the means used are given in Chapter II. The supervision and direction of the means of intercommunication provided by the signals is the duty of the general staff. The division of responsibility between the general staff and the signal organization is analogous to that between the staff and a service (Field Service Regulations, Volume I, 1930, Chapter III).

3. Signal personnel wear a distinctive blue and white arm band, and should be given priority on the roads by other arms, since their work is usually urgent. Except in an emergency or after reference to a responsible signal officer, they should not be employed on other duties.

4. The signal service is responsible for the correct official time; watches will be synchronized through the signal service before all operations.

8. Aircraft

(*See also* The Employment of Air Forces with the Army in the Field)

1. The air force contingent with an army in the field will normally include fighter, bomber and army co-operation squadrons and may also include bomber-transport aeroplanes (for troop carrying), intercommunication aircraft and kite balloons. The first duty of the contingent is to create and maintain an air situation which will enable the army and air force to work with the minimum of interference from enemy air action.

Fighter squadrons are equipped and trained primarily for the destruction of enemy aircraft in the air. In exceptional circumstances they can be employed for the attack of ground targets.

Bomber squadrons are employed both for bombing and for reconnaissance. Heavy and accurate air bombardment by day and night of vital centres in the system of command and maintenance may cause the most serious dislocation to the enemy's plan, and may also compel him to divert his fighter aircraft for their protection. The offensive action of bomber squadrons may thus combine direct support of the military operations with assistance in the maintenance of a favourable air situation. An immediate but temporary advantage in the struggle for air superiority may in certain conditions be obtained by an attack on enemy aerodromes. Columns of troops and transport, especially if concentrated in defiles, may also form important targets for air attack. Long-range strategical reconnaissance using the camera will generally be the responsibility of day bomber squadrons.

Army co-operation squadrons are trained specially for work with the army; their principal tasks are reconnaissance, including photography, and artillery observation. In exceptional circumstances they may also be used for the attack of ground targets. They are equipped for flying at night.

Both army co-operation and bomber squadrons may sometimes be used to drop small quantities of ammunition or other supplies on a detached force or for intercommunication between widely separated forces.

2. The number of army co-operation squadrons with a force is usually calculated on the basis of one for each division and one for each corps headquarters. They are not divisional

The Royal Air Force component of an army in the field will normally include fighter, bomber and army co-operation squadrons and may also include bomber-transport aeroplanes (which can be used for store or troop carrying), inter-communication aircraft and kite balloons.

In addition to providing the army with its necessary air reconnaissance, air transport and air intercommunication services, it will be the duty of the Royal Air Force to create and maintain an air situation which will enable the forces in the field to work with the minimum interference from enemy air action. This may be within the powers of the Royal Air Force component; but in certain circumstances it may require the co-operation of additional air forces operating either within the theatre of war or from bases situated outside it.

4. Page 16. Section 8, paragraph 1. *Delete* the first sub-paragraph and *substitute* :—

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1. An army in the field will always include a Royal Air Force component. There may also be in the field an air striking force, which will not necessarily be under the command of the military commander-in-chief. The air striking force, consisting of bomber and fighter squadrons, will be directed, in accordance with the general war plan of the Government, against objectives of which the bombardment will contribute in greatest measure to the breaking down of the enemy's resistance. At certain times such objectives may be of direct importance to the military operations in progress, and in general the offensive action of the air striking force will assist an army in the field by helping to create a favourable air situation.

units, but are allotted to formations by army headquarters as required.

A squadron consists of three flights each of four aircraft. The work it is capable of doing is measured by the number of flights of about two hours duration, known as "sorties," which it can perform on any given day. As a general guide, it may be considered capable of maintaining two aircraft in the air during the hours of daylight and also of carrying out an occasional additional flight. The squadron is the smallest self-contained air force unit, and is not usually sub-divided, since maintenance, photography, signals, etc., are organized on a squadron basis and cannot conveniently be split up. Only as a special measure may one or more flights be temporarily detached to a force carrying out a special mission.

3. The *kite balloon unit* is the section of two balloons, only one of which can, however, be flown at a time. Kite balloons carry two observers; they are held captive by a winch and cable which will allow them to rise to a height of 5,000 feet. They are used mainly for artillery observation. They are extremely vulnerable to shell fire, and also to the attack of hostile aircraft. They are therefore, as far as possible, kept out of artillery range and protected by anti-aircraft guns.

4. *Intercommunication aircraft* are able to fly safely at lower speeds and to land and take off from more confined spaces than operational types. They are required to enable commanders and staff officers to visit or observe their troops. They are not normally armed for defensive purposes and have a relatively low performance, so that they should not be used over enemy troops or under conditions in which they are subject to serious risk of attack by hostile aircraft.

5. Successful co-operation with air force units depends on a correct appreciation and allotment of tasks, on the issue of clear and adequate orders, on good liaison and on good intercommunication.

Intercommunication between air and ground is dealt with in Sec. **20.** Reconnaissance by aircraft is dealt with in Sec. **32.**

9. Smoke

1. Smoke used to blind enemy observation (especially of machine guns, automatic weapons and anti-tank guns) and to conceal the intentions and movements of one's own

troops, is one of the principal aids to reducing casualties and to overcoming hostile resistance. It is a weapon of value principally to the attacker, since it is the attacker who has movements and intentions to conceal; it is of particular importance when the location of enemy automatic weapons is unknown. It may be employed to blind observation, to protect a flank, to distract the enemy's attention from the real point of attack, to disperse his fire (since the tendency is to pour heavy fire into a smoke cloud in the belief that the attacker's troops are behind it), to cause him to disclose details of his defensive fire, and to keep him in a state of uncertainty. A few rounds of smoke may also be used as a signal to attacking infantry, to mark objectives or boundaries, or to notify the time for a fresh phase of the plan. There is much scope for imagination and variety in the use of smoke.

The defender must always be prepared for the use of smoke by the attacker, and must as far as possible so distribute his observation areas that his artillery have alternative means if one area is blinded by smoke; he must also make arrangements and lay down signals for defensive fire similar to those used by night. The defender may on occasions himself use smoke to hamper or confuse the attacker.

2. Smoke can be discharged by tanks (from the mortar bombs of support tanks, the exhaust pipes of tanks specially fitted, or by the dropping of smoke candles or generators); by infantry (from mortar bombs, rifle or hand grenades, or smoke candles laid by hand); or by artillery (by smoke shells fired by all natures of horse, mountain and field artillery). Tanks use smoke especially with the object of neutralizing anti-tank weapons, and of concealing the direction of their attack; infantry in order to blind enemy machine guns, so that they may rush or stalk them; artillery for any of the objects given in para. 1, above.

3. Smoke is a two-edged weapon; its indiscriminate use may cause one's own troops to lose direction, may disorganize the plans of units or formations on the flanks and will interfere seriously with artillery and air observation and with visual signalling. Its use, therefore, always requires careful consideration and control. The effectiveness of a smoke screen is largely dependent on climates and weather conditions, particularly on the strength and direction of the wind; a light wind (about ten miles an hour), a moist atmosphere and absence of sun are the most favourable. For a

purely local and passing use, such as by infantry against machine guns or by tanks against individual tank weapons, weather conditions are of minor importance. The thickness of a smoke screen can be varied, and in certain conditions a thin screen only may be desirable.

10. Gas

(*See* Manual of Defence against Gas)

1. Gas in its various forms has proved itself an effective weapon. Its use has been prohibited by an international convention. But an enemy who uses it may do so to inflict casualties; to reduce the efficiency of troops and to lower their morale, by compelling them to wear anti-gas respirators, and sometimes other protective equipment, for prolonged periods; or as a means of delay, by rendering areas of ground impassable without risk of casualties.

2. Gases used in war are classified as persistent or non-persistent. The non-persistent gases usually affect the lungs, eyes, nose or throat, and can be countered by the wearing of an efficient anti-gas respirator. The most dangerous of the persistent gases has a blistering effect on all parts of the body, and can penetrate ordinary clothing and footwear. It therefore necessitates special measures of protection in addition to the wearing of the anti-gas respirator. An area contaminated by blister gas remains dangerous for a period which varies according to the strength of the concentration, to weather conditions and to the type of ground contaminated, but the period may be prolonged for weeks. The effect of blister gas is often not felt for some hours, and men may be unaware at the time that they have been affected, though they will become casualties later.

3. The effective use of gas is largely dependent on weather conditions. Light winds and moderate temperature favour its use, also foggy or cloudy weather. Winds of over 12 miles an hour, warm sunny days, heavy rain or extreme cold tend to reduce its effectiveness. Ground has also some effect on gas, which tends to flow into valleys and gullies, and persists longer in deep hollows, dug-outs, cellars and other enclosed spaces.

4. Gas may be dropped from aircraft in the form of spray or by means of bombs; may be discharged from shells fired by artillery or mortars; or may be produced from drums

thrown by projectors, or from grenades thrown by hand; or may be released from cylinders in the form of a cloud; or the enemy may apply blister gas direct to an area which he desires to contaminate, by means of hand generators, of contact or delay-action mines, of containers fired by time fuze or of vehicles specially fitted for spraying. Of the above, gas attack by aircraft is the form most likely to be met in mobile warfare; area contamination may also be employed by an enemy, especially in a retirement (*see* Sec. **44**, 3). Gas shelling by artillery, and attacks by means of projectors or cylinders, belong to the more deliberate types of warfare, but an attack by cylinders carried in vehicles, for the production of a choking gas cloud, is possible: this form is known as a beam attack, and can only be delivered when conditions as to wind, concealment, etc., favour the enemy: the vehicles may have to be brought up and the attack delivered under cover of darkness.

The enemy may provide his mobile troops with small containers or grenades of blister or tear gas, to contaminate billets, cross-roads, approaches to watering places, etc.

5. The gas used in spraying by aircraft is likely to be blister gas. This will be an especially dangerous form of attack, since the range and speed of aircraft will often enable them to produce surprise, a most potent factor in the use of gas.

In attacks by air bombing, the enemy may drop gas bombs in the same way, and possibly at the same time, as H.E. bombs. Blister gas is likely to be the most usual filling, but any type of gas may be used. Since air bombs do not have to withstand the shock of discharge from a gun, their construction is lighter, and their gas content greater, than that of a shell of similar size fired from an artillery weapon.

The base and lines of communication may at any time be subjected to gas attacks from enemy aircraft (*see* Field Service Regulations, Volume III, 1935, Chapter III).

6. Since the gas content of shells fired by artillery is comparatively small (*see* above), the enemy will require a large number of shells to produce an effective concentration, and difficulties of ammunition supply will therefore restrict gas shelling in mobile warfare.

Attacks by projector or by cylinder require considerable transport and long preparation, and can be delivered only

from short range; they are therefore more likely to be met in position warfare.

7. The enemy may use smoke in conjunction with gas. He may put small quantities of gas into a smoke screen to simulate a gas attack and to compel the use of respirators; or he may use smoke to extend the flanks of a cloud gas attack, so as to conceal the actual frontage of the cloud and to induce the wearing of respirators on a wide front. Smoke shells may often be fired in combination with gas shells. It is also possible that smoke may be used in conjunction with a low-flying spray attack.

8. Methods of defence against gas are dealt with in Sec. **40**.

CHAPTER II

THE COMMAND AND CONTROL OF TROOPS IN BATTLE

11. The elements of tactics

1. Modern weapons and the conditions of battle which they have created throw increasing responsibility on junior commanders: success in battle will depend largely on their efficiency. The essential qualities of leadership, morale, the fighting spirit and discipline are defined and described in Training Regulations, 1934, Sec. 2, which should be read in conjunction with this chapter. Although leadership is not born of learning, and in battle rests mainly on such qualities as energy, endurance, vigilance, activity and a constant inquisitiveness, yet without a thorough understanding of the elements of tactics these qualities will not be properly applied and will fail to achieve the success which they deserve.

2. Tactics on the battlefield are governed by certain simple commonsense precepts, which are in the main very similar to those which govern everyday life. The ordinary citizen who is planning a business transaction, goes through much the same steps as the commander in the field who is planning an operation. Both begin by informing themselves as fully as possible; both, if they are wise, limit their enterprise to suit their means; both can best arrive at a decision by summing up to themselves in the form of a balanced statement the pros and cons of the various choices before them; both have to take into their calculations the possible schemes of rivals without allowing their judgment to be upset by fear of their action; both, if they be men of character, will abide by a decision once made and carry out what they have planned, unless some entirely unforeseen circumstances occur. Thus the occasions both of peace and of war call for the same qualities of commonsense and a balanced judgment. But in war the time factor is always more urgent, information is

harder to get and less reliable, and the psychological factors of fear and exhaustion are often present. Thus it is not that the commonsense qualities required in war are different from those required in peace, but that the conditions of war are so utterly unfamiliar to the ordinary civilized man; and the more civilized life becomes and the more complex the methods of war, the greater is the tendency of the average man to find difficulty in applying to battle the ordinary dictates of commonsense.

3. The first and most constant difficulty of the commander in war—apart from the inherent elements of danger and fatigue—is the continual succession of unforeseen incidents and obstacles which tend to impede him in accomplishing what he has set out to do. Such obstacles may occur even though the greatest forethought has been exercised: the enemy does something unexpected; an important message goes astray or is delayed; some turn of the weather such as fog or heavy rain upsets calculations; a subordinate leader becomes a casualty at the critical moment, and so forth. In any tactical operation, great or small, it is the duty of every commander, whatever the size of his command, to define clearly to himself the object which he seeks to attain and thereafter to allow nothing to distract him from it. His next duty is to apply to his task the commonsense rules which have guided all fighting since the earliest days, rules which the boxer, for example, learns and follows instinctively in the ring. The most important of these is always to endeavour to surprise and distract the enemy, since an enemy thrown off his guard by an unexpected blow or a skilful feint is at a serious moral and physical disadvantage. Again, speed in action must be cultivated; the power to think quickly in an emergency is one of the greatest assets both of the boxer and of the commander; and the power to move quickly often gives to a body of troops, as to a boxer, the advantage of surprise. Next, it is obvious commonsense to concentrate all available means, physical, moral and material, on the task in hand; and consequently to reduce to a minimum the forces necessary for other purposes, e.g., for distracting the enemy's attention, for parrying his blows, and so forth. To be always alert and to keep his guard up is instinctive to every boxer; so must constant watchfulness and protection be instinctive to every commander of troops. As hand and foot and eye have to work together in the boxer, so can the power of a military force be exercised fully, only

if all parts work in combination. Lastly, as every boxer knows that he must "lead" to win a fight, so must every commander realize that offensive action is necessary sooner or later for the overthrow of the enemy.

Such are some of the guiding rules or principles for tactical success: the principles of surprise, of mobility, of concentration, of economy of force, of security, of co-operation and of offensive action. These are principles or maxims in just the same sense that "honesty is the best policy" and "cut your coat according to your cloth" are maxims for the conduct of everyday life.

4. These commonsense precepts, or principles, are easy enough to learn and grasp: but they are no more a complete set of rules for success in war than are the two maxims quoted in the last paragraph a complete guide to the conduct of life. Sometimes even they are divergent, in that one can only be fully observed at the expense of another. Their application to the situations and problems of the battlefield, which are never twice the same, needs constant practice and study. Some further explanation of them is given in the following paragraph, but only practice in peace or experience in war can make them, as they should be, as instinctive to the soldier as is his art to the boxer.

5. *Surprise*, which should be sought equally by the army commander and the section leader, may be obtained by calculated deception of the enemy and distraction of a part of his forces, by varying tactical methods, or by skilful concealment of movements and intentions, in which night operations may be a considerable factor. To threaten two points and to keep the enemy in doubt until the last possible moment at which the blow is to be struck often provides a means of surprising him. The defence, with its greater facilities for concealment, offers as much opportunity for surprise as the attack.

Mobility may be the result of good organization, of good equipment or of good discipline and training; the will power and driving force of a commander is a powerful factor. Time is the most precious element in war, and the saving of it by all possible means is the surest test of a good commander.

To know when and where to *concentrate* and when and where to *economize*, in fact how to distribute the force available, is a large part of the art of command, and cannot be learnt by any mere rules. To balance the requirements of a reasonable security in other parts of the field with the necessity to concentrate all possible strength on that part where a decision is being sought by offensive action requires experience and judgment. Further, in the course of any operation demands for reinforcement or to meet some fresh emergency are always being made on the commander, or doubts arise in his own mind, which tend to divert his strength from the main objective: he must learn how far to resist or satisfy these.

Concentration implies always a concentration of will-power, of enthusiasm and of effort of all kinds towards the object in hand; but it must not be interpreted necessarily to mean the collection of the greatest number of troops at a given point, it may often mean the concentration of fire, while the troops applying the fire remain dispersed.

Security is dealt with in Chapter V, and the need for *co-operation* in Chapter I. The necessity for *offensive* action and the moral advantages which it confers are emphasized in Chapter VI.

12. Command on the battlefield

1. A subordinate commander who is given a task in the field has, as a rule, the following successive steps to take:—

i. To make certain that he understands his orders, is clear as to his object and has grasped all the information available which will assist him in his task.

ii. To study his map, think out with its help his most promising line of action, and how he can amplify his information by reconnaissance in the time available.

iii. To reconnoitre the ground, so far as time will permit: a commander has often to make time for reconnaissance by hurrying on ahead, while ordering his command to follow him to some selected rendezvous, which should be under cover.

iv. After reconnaissance, to make a plan, remembering that fire is the most potent factor in war, that surprise is the most effective weapon and that the simpler the plan the more likely it is to succeed: the plan, whether offensive or defensive, should be made in terms of fire power rather than of men; it should make the best possible use of the ground and should not look too far ahead.

v. To communicate his plan to his subordinates, in view of the ground if possible, by clear and concise verbal orders, allotting a definite task to each sub-unit.

vi. To place himself where he can best control the course of the action, remembering that at the crisis personal example and leadership are the best means to ensure success.

2. The proper *use of ground* is a most important factor in all tactical operations: constant study is required to appreciate its influence on the varying phases of the battle. Thus in the attack, good positions for supporting fire and for observation, the approaches to the enemy which offer the best cover from his fire, and features which will facilitate fire in enfilade or a flank attack are to be sought. For the defence, facilities for concealment and resistance are essential, natural cover being preferable to artificial; and good observation confers a very considerable advantage. The suitability, or otherwise, of the ground for the action of armoured troops, or the existence of obstacles to their passage, may have a decisive influence on a plan of action. The use of natural features to give concealment from hostile aircraft will usually be of importance. Such are a few examples of the effect of ground on operations: a so-called "eye for ground" can be acquired only by constant thought and practice.

13. Orders and instructions

1. Command in the field is exercised by means of:—

i. *standing orders* and *routine orders*, which regulate the general daily life of a force in the field, in accordance with the conditions of the campaign;

ii. *operation orders*, which deal with a particular strategical or tactical move or operation: they are supplemented, when necessary, by *operation instructions* and *administrative orders*.

2. The object of *standing orders* is to adapt existing regulations to local conditions and to avoid repetitions in routine and operation orders. *Routine orders* are used to supplement standing orders, to facilitate the working of the administrative services, and to reduce correspondence and returns. Standing orders and routine orders are printed or typewritten, and are given a wide distribution. Further rules for their issue are given in Field Service Regulations, Volume I.

3. The object of *operation orders* is to bring about a course of action in accordance with the intentions of the commander and with full co-operation between all arms and services. Further rules for their issue are given in Sec. 15.

4. *Operation instructions* are used instead of, or to supplement, operation orders when it is necessary to place a subordinate commander in a position in which he must act on his own judgment. These instructions will give the subordinate commander all available information likely to affect the performance of his task, and will state clearly the object to be attained, but will leave the methods to his discretion. They should include a brief statement of the courses open to [illegible] of his probable action, as well as a forecast

2. Page 27. Section 13, paragraph 4.—*Delete* from "Orders" in line 11 to "operation" in line 13 and *substitute* "Operation." 1

[illegible] than ... sparingly used. They will usually be couched in less formal terms than orders. When special considerations of secrecy demand it, such instructions may be addressed to a commander personally. If it is essential that a commander should be informed of the scope of an operation instruction issued to another commander, a copy of the instruction may be issued to him for information.

5. The matters on which *administrative orders* may be necessary are given in Appendix V. The staff is responsible that heads of services and their representatives are kept informed of so much of the intentions of the commander as it may be necessary for them to know in order that they may carry out their work efficiently.

14. Orders—general principles

1. An order must contain only what the recipient requires to know, in order to carry out his task. Any attempt to prescribe to a subordinate commander at a distance anything that he, with a fuller knowledge of local conditions, should be able to decide on the spot will be avoided.

2. In framing orders for operations, the general principle is that the object to be attained, with such information as affects its attainment, will be briefly but clearly stated: the actual method of attaining the object will be given in sufficient detail to ensure co-ordination of effort, but so as not to

interfere with the initiative of subordinate commanders, who should be left freedom of action in all matters which they can or should arrange for themselves.

3. So that all parts of a force may understand clearly the task allotted to each part and thus be able to co-operate fully, the whole of the orders for any particular operation by the force should, whenever possible, be embodied in one operation order and not in a series of separate orders to different parts of the force.

4. When a detachment is made, its commander will be specified in the order. If a detachment is composed of different units, a rendezvous must be arranged, at which representatives of units will meet the appointed commander, or his representative.

5. Notwithstanding the greatest skill and care in framing orders, unexpected circumstances may render the precise execution of an order unsuitable or impracticable. In such circumstances the following principles will guide the recipient of an order in deciding his course of action :—

i. A formal order will never be departed from either in letter or spirit so long as the officer who issued it is present, or there is time to report to him and await a reply without losing an opportunity or endangering the force concerned.

ii. If the above conditions cannot be fulfilled, a departure from either the spirit or the letter of an order is justified if the subordinate who assumes the responsibility bases his decision on some fact which could not be known to the officer who issued the order, and if he is satisfied that he is acting as his superior would order him to act were he present.

iii. If a subordinate neglects to depart from the letter of his orders when such departure, in the circumstances of sub-para. ii, above, is clearly demanded, he will be held responsible for any failure that may ensue.

iv. Should a subordinate find it necessary to depart from an order, he will immediately inform the issuer of it, and the commanders of any neighbouring units likely to be affected.

6. In instances of urgency, an order may be given to a subordinate commander without having been passed through the usual official channel. The commander who issues such

5. Page 29. Section 15, paragraph 1.

Line 5. *After* " sender " *insert* :—

Amdt. 2 May, 1937 , with the exception that messages by radio-telephony wi not be repeated back

Line 8. *After* " unit." *insert* :—

Amdt. 2 May, 1937 If sent in message form, however, appointment and formatio or unit will not be given.

order will inform the intermediate authorities concerned and neighbouring formations likely to be affected. The recipient of the order will inform his immediate superior of its receipt and of the action which he is taking on it.

15. Issue of orders for operations

1. Orders, instructions, reports and messages must be clear and precise. They will, whenever possible, be issued, or confirmed, in writing (*see also* paragraph 3, below). If sent by telephone, they will be written down by the recipient, and repeated back to the sender. If written, they must be easily legible, must be timed, and must be signed by the sender, who will give his rank, appointment and formation or unit. Paragraphs should be numbered to facilitate reference. Detailed rules for drafting orders, instructions and messages; the definition of " zero hour," etc., are given in Appendix IV.

2. No matter how complete, how appropriate and how correctly drawn up an order may be, it fails of its purpose if it does not arrive in time. The commander who issues an order is responsible that it reaches his subordinates in time to enable them to make all the necessary preparations, including the framing and issue of their own orders, before troops are committed to action in execution of the order. When detailed operation orders cannot be issued in sufficient time to enable the troops to make the necessary preparation, a " warning order " should be issued; this order should give sufficient information to enable all the necessary preparations to be made.

3. Since the success of any operation depends largely on the time factor, orders in the field will often be issued verbally. A commander can impress his will and inspire confidence in the success of an operation far more easily through verbal orders, if well issued, than by pages of written orders. A commander will therefore often find it desirable to assemble his subordinate commanders before an operation, to explain his plan and to issue his orders.

When the orders for an operation are issued verbally, written comfirming orders will subsequently be issued whenever practicable. When, however, it is impossible for the complete confirming order to reach recipients in time to affect the action ordered, such an order may be confined to a brief message confirming essential points, such as objectives, starting lines, boundaries, routes and times. Whether a

confirming order is to be issued or not, the staff of the commander issuing the verbal orders will ensure, before subordinate commanders rejoin their units, that their written notes embody the essential points, which may often most conveniently be marked on maps.

Verbal orders will follow the same sequence and form as written orders (*see* paragraph 4, below). Indefinite or badly delivered verbal orders may do much to destroy confidence in success.

4. The form of an operation order may vary according to the formation or unit which issues it, the nature of the operation, the time available and the methods of distribution at hand. Elaboration and formalism in the writing of orders must be avoided: orders should be confined to essentials and should be as brief, in subject matter, in headings and in appendices, as is consistent with clearness. But a recognized form and sequence should always be followed as nearly as practicable, since this makes important omissions less likely, and assists subordinates, who can more easily grasp the meaning of an order issued in a form with which they are familiar.

The form is as follows * :—

SECRET

..... (Formation or Unit) Operation Order No.....

Copy No. .....

Ref. Map .....

Date .....

INFORMATION.—

Regarding the enemy.—A summary of the information on which the plan is based, so far as the recipients require to know it.

Regarding our own troops.—A summary of the situation and intentions of any neighbouring troops, whose action may affect the action of the recipient of the order. A higher commander's intention will be repeated in the orders of subordinates only when, and so far as, it is essential to do so.

* An operation order sent by telegraph or wireless should be in the form given in Appendix IV, Sec. V, 16.

In the interests of secrecy, it will often be advisable to include it in the order in outline only; the intention may then be amplified separately, either verbally or in writing.

INTENTION.—

A clear, concise and decisive statement of what the commander intends to achieve. The intention stated should not exceed what is to be effected by the plan embodied in the order, and should normally be drafted by the commander himself; it should be expressed in the future imperative tense, i.e. "will." Alternative intentions depending on developments should not be given in operation orders.

METHOD.—

A statement of the tasks allotted to the formations or units, in sufficient detail to ensure co-operation.

ADMINISTRATIVE ARRANGEMENTS.—

A statement of the general administrative arrangements so far as all recipients of the order require to know them.

It may be convenient to issue details of administrative arrangements separately, either as an appendix or in administrative orders.

INTERCOMMUNICATION.—

Such paragraphs as are necessary regarding intercommunication, e.g. :—

Location of headquarters.
Routes to be followed by headquarters of subordinate formations.
Liaison duties.
Orders for wireless silence or other restriction on the use of wireless.
Allotment of R.A.F. wireless tenders.
Any pre-arranged light signals.

ACKNOWLEDGE.—

(Signature, rank, and appointment of officer signing order.) .....

METHOD OF ISSUE.—

TIME OF SIGNATURE.—

DISTRIBUTION.—

The list of addresses to whom copies of the order are issued will be included in all copies. The number of copies should be kept as low as possible, both in the interests of secrecy and because of the difficulties of reproduction in the field.

The distribution list should be in suitable order, e.g. :—

Own subordinate formations or units.
Attached troops.
Formations and units co-operating.
Own commander.
Own staff.
Own services.
File and war diary.

Operation orders, operation instructions and administrative orders must be immediately acknowledged by all recipients as a matter of routine.

5. In principle, a commander's orders are issued only to those under his immediate command who are required to take action on them. Copies to flank formations or units may, however, be issued for information, if effective co-operation cannot otherwise be secured. A copy will not be sent to the next higher formation, unless ordered or as the most convenient means of keeping a superior in touch with the situation.

The issue of a sufficient number of copies of a commander's operation orders to his immediately subordinate commanders for distribution to the formations or units under their command should be very exceptional : but it may on occasion be convenient to distribute appendices (*see* para. 6, below) containing long or complicated arrangements which would otherwise have to be repeated in the orders of lower formations.

A subordinate commander who issues copies of his superior's orders without receiving permission to do so will be responsible

3. Page 32, Section 15, paragraph 6, line 3.—*After* " fire plan " *insert* " reconnaisance."

often be advisable to place in appendices such matter as details of the fire plan or of the order of march. Repetition between the main order and appendices must be avoided. Sometimes the order may be simplified by the issue of a sketch

6. Page 33. Section 16, paragraph 2, i.

Line 2. *After* " to " *insert* " the headquarters of ".

Line 3. *Add* :—

Communications between headquarters and rear headquarters of a formation is the responsibility of the formation concerned.

map or tracing as an appendix. It is not necessary for every recipient of an order to be provided with all the appendices; on the other hand, it may be desirable to issue appendices to subordinates to whom copies of the order have not been issued (*see* para. 5, above).

16. Means of intercommunication

1. Efficient means of intercommunication, both from front to rear and laterally, are essential to the success of military operations. Effective signal arrangements can be made only when the signal officer at a headquarters is given the earliest possible information of projected operations and movements. The responsibility for this rests with the general staff; but the signal officer must at all times use his initiative in suggesting and organizing the signal communications likely to be required.

2. The following general principles govern responsibility for intercommunication in the field :—

i. The higher formation is responsible for the provision and maintenance of communications to the next lower formation or unit.

ii. Responsibility for lateral communication is from right to left unless otherwise ordered, i.e., each formation or unit is responsible for communication with the formation or unit next to its left. Where the higher formation wishes subordinate headquarters to be in wireless communication with each other, it will normally provide the necessary wireless sets and detachments.

iii. Fighting units are responsible for their own internal communications.

iv. A formation or unit is responsible for the provision and maintenance of communication with its supporting artillery.

The above principles, however, do not absolve any commander from the duty to take all steps in his power to provide the communications required by the tactical situation, when for any reason it has not been possible for communications to be provided in accordance with those principles.

3. The means of intercommunication in the field are :—

i. Line telegraphy and telephony (L/T).
ii. Wireless communication, either wireless telegraphy (W/T) or radio telephony (R/T).
iii. Visual telegraphy (V/T).
iv. Message carrying by any suitable agency, ranging from a dismounted orderly to an aeroplane.
v. Liaison personnel.
vi. The postal service.

4. Line communication is rapid and accurate and has a great traffic carrying capacity; discussion by telephone is possible; and messages by line are less liable to interception by an enemy than those sent by other means (*see*, however, Sec. **90**, 3). Line communication, however, takes time to lay, and is very vulnerable. Cables laid on the ground are easily broken by shell fire or by moving troops and vehicles, especially by tracked vehicles; it is in fact almost impossible to maintain cable in front of brigade headquarters when fire or traffic is heavy, unless time and labour is available to bury it, as in position warfare. Poled lines in rear of the forward zone are easier to maintain and will normally form the backbone of the signal system, but may be broken by severe weather, by bombing or by the action of unfriendly inhabitants.

5. The chief advantages of wireless communication are that it can be established quickly and is invulnerable between its terminals. Wireless sets can be rapidly set up and moved; many types can work while moving. The disadvantages are that it can be overheard by the enemy, thus often necessitating the use of cipher with consequent slowness and delay (*see* Sec. **19**), and is liable to interruption by atmospheric disturbances or by deliberate enemy action, or to interference by friendly stations, which limits the number of sets that can be worked in a given area; also that it requires skilled operators, who are not easy to train or replace. Radio telephony conversations require practice and are slow, since speech is one-way only at a time; they must be phrased so that they convey no useful information to the enemy. (*See* Sec. **19**, 4.)

6. The apparatus for visual signalling is simpler and more easily portable than wireless equipment; it is equally invulnerable between its terminals; and the operators require less training. It is therefore of value for tactical use by units of all arms in the forward area. Its great disadvantage is that the stations must see each other: this limits its range and its usefulness in close country or in thick weather. Visual signalling is slow, and may be seen and read by the enemy. The most generally useful instrument is the electric lamp, which can be used by day or night up to an average range of two miles by day and six miles by night.

7. Messages may be carried by orderlies on foot, by horsemen, by cyclists, by motor cyclists, by motor-cars or by aircraft; or in certain circumstances by carrier pigeons, messenger dogs, or even rockets. Message carrying is the simplest of all methods and often the only method available in battle: for long messages it is often quicker than telegraphy, and enables maps, sketches or other documents to be sent. It is secret, unless the bearer is captured. The personnel are comparatively easy to train. A special despatch rider (S.D.R.) often provides the most rapid means of sending an important message. (*See* Sec. **19**, 6.)

The main disadvantage is that the bearers of messages may go astray or become casualties, leaving the originator of a message uncertain whether it has been delivered or not, and whether it may have fallen into the enemy's hands. Also the method is uneconomical, in that the available messengers may quickly get used up or exhausted. When possible, to effect economy, a despatch rider letter service (D.R.L.S.) is organized, running periodically between headquarters on a pre-arranged time table. The D.R.L.S. should be used as much as possible, in order to reserve the other means of communication for more urgent messages.

8. Liaison personnel, officers or N.C.Os., are one of the most useful means of intercommunication, especially in the forward area. They are not merely bearers of messages; they should be acquainted with the plans and intentions of the commander whom they serve, and thus be able to amplify and explain any orders they bring to subordinate commanders. It is also their duty, on their return from subordinate units, to be able to give the superior commander a clear picture of the situation there. Thus they must be specially trained men, on whose judgment and knowledge a commander can rely.

9. The army postal service is used for the less urgent official messages. Details of its working will be found in Field Service Regulations, Volume I.

17. Signal offices and signal centres

1. In order to co-ordinate the various means of communication, other than the postal service, and to ensure that messages are dealt with systematically, a signal office is established at the headquarters of every formation and at the headquarters of such units as carry signallers on their establishment or are provided with a signal section. The duties of the personnel of signal offices are to receive, record, despatch and deliver messages. It is the duty of the originator, not of the signal personnel, to keep any copies required of messages sent.

2. It is sometimes convenient temporarily to establish a special signal office at a point which is not a headquarters, but at which means of communication with two or more headquarters may be concentrated. Such an office, which may be established by a higher formation in the vicinity of the headquarters of lower formations or units, is called a signal centre. After deployment, communication with the headquarters of subordinate formations and units can often most conveniently be arranged by means of signal centres. When a headquarters halts beside a signal centre, its signal office will continue to act as such for the headquarters, but will, if it is convenient and economical, use the means provided by the signal centre to dispose of its messages. Signal centres, if properly used, should effect economy in signal personnel and material. A formation may establish a signal centre at a site to which its headquarters will move later. When the move takes place, the signal centre becomes the signal office of that headquarters.

18. Rules for signal traffic

1. All messages will be prepared in accordance with the rules laid down in Appendix IV. The signal service is responsible, subject to any special instruction from the staff, for selecting the method or methods of despatch. Important messages may be sent by more than one route or method.

2. Any officer may originate a message for transmission by signals, which will be accepted by a signal office provided that it is legible and signed by the originator, who is responsible that it is sufficiently urgent to justify its being sent by signals and not by post.

Messages are sent in the order in which they are handed in unless a special degree of priority is indicated by the originator.

They will be classified in the following categories in accordance with their relative urgency.—

i. (*a*) Most immediate. (*b*) Emergency operations.
ii. Immediate.
iii. Important.
iv. Other official messages.
v. Private messages, when they are accepted.

Precedence of despatch for messages franked in the same way will be according to the time of their receipt by signals.

Lists of officers authorized to frank "emergency operations," "immediate" and "important" messages will be prepared by the general staff and published in routine orders. Only officers authorized to send "most immediate" or "emergency operation" messages will be permitted to use R/T in rear of divisional headquarters.

Officers entitled to send "immediate" messages may demand a special despatch rider, and may also make priority telephone calls. Such calls take precedence over all other waiting calls, but a conversation in progress will not be interrupted for them.

Only a commander-in-chief or his chief general staff officer will frank messages "most immediate." This indication will be reserved for messages of vital urgency; it not only gives absolute priority of dispatch on army signal systems but on those of the Royal Navy and Royal Air Force, and on those controlled by civil administrations.

The indication "emergency operations" will be used only for messages of the utmost importance having a direct bearing on operations.

The use of "immediate" will be limited to messages the speed of which is of special importance, as otherwise its purpose will be defeated. In urgent cases any officer may frank a message as "immediate," but, if unauthorized to do so, he will be held responsible that the urgency is sufficient to justify his action.

The indication "important" will be used for those messages which require priority above the ordinary service message, such as signal service messages dealing with the working of the signal system. Signal officers are authorized to frank messages in this way.

In theatres of war where private messages are accepted, special instructions for their disposal will be issued in routine orders. Such messages will always take precedence after ordinary service traffic.

3. The staff at a headquarters will make their own arrangements for checking the acknowledgment of any messages which the recipients have been ordered to acknowledge (e.g. operation orders, which should be acknowledged as a matter of routine). Signals will be responsible, however, for advising the staff of any undue delay in transmission and the delivery of messages, orders, etc., whether acknowledgment has been ordered or not. It will usually be advisable for the staff of a headquarters to draw up suitable instructions to signals on the procedure to be followed in reporting delays.

4. When messages of special importance are sent, for example operation orders or "emergency operations" messages, signals may be instructed to inform the staff of the time and method of despatch and the probable time of delivery, as well as of any undue delay in acknowledgment.

5. Any interruption or delay in signal communications will be reported to the operations section of the general staff immediately it occurs. Should any delay be caused or anticipated by reasons of an unusual pressure of traffic, the operations section of the general staff will take steps to regulate the despatch of messages in their relative order of urgency. In the absence of general staff instructions, the signal officer in charge is authorized to use his own judgment in the regulation of the despatch of messages.

Signals Security- es 2(7) 1937

19. ~~Security of messages~~

1. All messages sent by wireless telegraphy or radio telephony are liable to interception by an enemy with modern equipment. The approximate position of a wireless station can also generally be determined by an enemy with direction finding apparatus.

The use of cipher, the rendering of addresses unintelligible to the enemy by the use of code names (*see* Appendix IV) and observance of the rules given in paragraph 3, below, will reduce the danger of the enemy gaining information from intercepted wireless messages.

All headquarters in the field which may require to u cipher are provided with the means of enciphering and

Substituted s 2(8) 5/37

A commander who is anxious to conceal the dispositic and move.nents of his troops will therefore risk the loss surprise unless he considers the factor of restriction or parti restriction in the use of wireless. No fixed rules can be given but as a general guide wireless silence should be observed in reserve formations, and formations in movement whic are not in contact with the enemy. Wireless silence is seldom justified in a formation of which the main body is deployed in contact with the enemy, or in units employed on reconnaissance which rely chiefly on wireless for the transmission of their reports. The question of ordering wireless silence must therefore be considered with other factors which affect the secrecy of the plan on the one hand and the need for control and information on the other.

Where wireless communication is employed, the use of cipher as in paragraph 3 below and the precautions prescribed in paragraph 4 will reduce the danger of the enemy gaining information from intercepted messages.

All headquarters in the field which may require to use cipher are provided with the means of enciphering and deciphering messages. The use of unauthorized ciphers and codes is forbidden.

8. Pages 38 and 39. *Delete* paragraph 1 and *substitute* :—

Amdt. 2
May, 1937

1. All messages sent by wireless telegraphy or radio-telephony are liable to interception by an enemy. The approximate position of a wireless station can also generally be determined by an enemy with direction-finding apparatus

Page 39.

Amdt. 2
May, 193

Paragraph 2, line 3. *Delete* " use of wireless or the ".

Paragraph 3, ii, lines 1 and 2. *Delete* " messages may be sent in clear on the authority of " and *substitute* " messages may be franked to be sent AS WRITTEN by ".

Paragraph 3, iii, line 3. *Delete* " sent in clear " and *substitute* " franked to be sent AS WRITTEN ".

Paragraph 4. *Add* new subparagraph :—

Amdt. 2
May, 193

Conversations should be kept as short as possible.

10. Pages 39 and 40. *Delete* paragraph 5 and *substitute* :—

Amdt. 2
May, 193

5. Formations and units are allotted code names by the general staff. The rules for their use are given in Appendix IV, Sec. V, 6. The precautions necessary in the use of the telephone in deliberate operations or for conditions approaching stabilization are given in Sec. 90.

ciphering messages. The use of unauthorized ciphers and codes is forbidden.

2. Although wireless messages may be intercepted, a certain interval must always elapse before the enemy can act on the information received. The use of wireless or the sending of wireless messages in clear is therefore justified when the message is urgent and it is considered that the situation will have changed sufficiently by the time the enemy can act on the information for it to be of little value to him. The possibility of a message containing information which is of value to the enemy for the future, even though he has not time to take action on it for the present, must, however, be considered. Apparently harmless administrative messages sent in clear may enable the enemy to deduce the presence of fresh troops in an area or the nature of future plans.

3. The following rules are given for guidance in the use of wireless :—

i. Messages by wireless will normally be sent in cipher.

ii. In rear of brigade headquarters, messages may be sent in clear on the authority of officers authorized to frank "emergency operations" messages, when speed is vital and it is considered that the enemy cannot take effective action on the message if intercepted.

iii. In front of brigade headquarters, messages dealing with operations in progress, when contact with the enemy has been made, may be sent in clear. Code names will, however, be used and other precautions taken to prevent the enemy obtaining information (*see* para. **4**, below).

4. The use of radio-telephony for conversations requires considerable attention and practice, to avoid giving away valuable information by the careless mention of times, places, and names of units. The danger can be largely overcome by thinking out the wording of the message before starting a conversation and making notes of it. References to the paragraphs of orders and instructions, and prearranged code words and phrases to describe positions and actions should be used as far as possible.

5. Appendix IV gives rules for the use of code-names in messages; and Sec. **90** the precautions necessary in the use

of the telephone in deliberate operations or in conditions approaching stabilization.

6. If messages by despatch rider are liable to fall into the enemy's hands or line communication is liable to be intercepted, the general staff will give the necessary warning to the intercommunication personnel.

20. Communication with aircraft

1. The army is responsible for the provision and maintenance of ground communication (by line, wireless, or D.R.) between the headquarters of army formations and the headquarters of air force formations or units; and of ground communication, other than by wireless, between air force formations and their air units. All ground communication is in fact an army responsibility, except that wireless sets for communication between their own formations and units are provided by the air force.

2. Communication between aircraft in the air and troops on the ground is, generally speaking, the responsibility of the air force, which provides, operates and maintains wireless sets for this purpose. The normal methods of communication are :—

i. For medium reconnaissance, two-way W/T efficient up to a range of approximately 75 miles : the ground set is usually at corps headquarters.

ii. For close reconnaissance, two-way R/T efficient up to a range of approximately 50 miles : wireless tenders carrying the ground sets are allotted to formations or units as required.

iii. For artillery reconnaissance, W/T from the air. The artillery commander may be provided with R/T for communication with the pilot ; if one-way W/T is used, messages to the air can only be sent by ground strips (strips of white cloth laid out to form the letters of a pre-arranged code).

In the event of wireless communication failing or being unsuitable, message dropping and picking up may be employed, ground strips being used to indicate to the aircraft the place chosen : but this has many disadvantages, since it takes the pilot away from his reconnaissance area and may give away the position of the headquarters where the message

is dropped or picked up. The provision and operation of message dropping and picking-up stations and of ground strips is the responsibility of the army.

3. When aircraft are employed to locate our own troops in battle, they will be specially marked and will call for flares or other means of identification from the troops by firing a succession of white signal lights. The troops will then indicate their position by lighting flares, by displaying tin discs or by ground strips. The method to be used must be previously laid down in orders.

CHAPTER III

MOVEMENTS BY LAND AND AIR, AND QUARTERS

21. Marches—general

1. The strategical or tactical considerations which govern the movement of armies in a theatre of war, e.g. the front on which a force may move, the order of march and the extent to which use can be made of mechanization, are discussed in Field Service Regulations, Volume III. Protection on the march is dealt with in Chapter V of the present volume and night marches in Chapter VIII.

2. The length of marches will obviously be governed mainly by the strategical or tactical situation; but the physical and moral state of the troops, as well as conditions of weather and of road, must be taken into consideration. As a general guide, a column of all arms of the size of a division will not, even in favourable conditions, average more than 15 miles a day, with one day's rest at least once a week, without some loss of efficiency. Small columns of seasoned troops can be expected to maintain a higher average: and any body of well-disciplined troops will, when circumstances demand a special and continuous effort, cover greater distances; but the risk of casualties and loss of efficiency must be weighed against the advantage sought by forced marches.* Troops will respond better to the demand for a special effort if the reasons for it can be made known to them. Infantry should rarely be called upon to exceed the regulation rate of marching; such efforts usually exhaust the men and fail in their object; a forced march is made by extending the number of hours during which the troops are marching without long halts rather than by increasing the pace of marching.

* In the fortnight between August 23, 1914 (Battle of Mons) and September 5 (the last day of the retreat) the British Expeditionary Force covered 200 miles in difficult conditions, in very hot weather and with considerable fighting. The force was still capable of a further week's continuous marching, to the Aisne—and of fighting three actions (on the Petit Morin, the Marne and the Aisne).

Large bodies of horsemen, such as a cavalry division, may be expected to average 25 to 30 miles a day and retain their efficiency; and can cover 40 miles a day as a special effort.

3. Good marching depends firstly on careful arrangements by commanders and staff to consider the comfort of the troops and to save them unnecessary fatigue by all possible means, so far as the tactical situation permits; secondly, on the strict enforcement by regimental officers of the rules of march discipline during the march, and on their management and care of the men before and after a march.

Staff arrangements which affect the comfort of the troops are the hour of starting, the selection and marking of the route, traffic control, the provision for halts, the regulation of the movement of " B " echelon of the first-line transport and of the supply and baggage companies, so that the troops receive their food, baggage and blankets with the least possible delay, and good quartering dispositions. The duties of regimental officers, besides the maintenance of march discipline (Sec. 22), include the care of the men's feet, good feeding arrangements, and the contrivance of as many hours of undisturbed rest as possible (especially of rest during the day, if the marching is done at night).

4. In fixing the hour of starting, time should be allowed, if the situation permits, for the men to have their breakfasts without hurry. It must be remembered that, with a force of the size of a division, if a time is named for the division to pass a starting point, a considerable proportion of the troops will have to rouse and start preparations three hours before that time. It is, however, preferable to start before daylight rather than to reach the destination late; the halting place for the night should, if possible, be reached at least two hours before sunset, to enable outposts to take up their positions and administrative arrangements to be made before dark. The desire to avoid observation from the air may, however, lead to a march being prolonged after dusk.

5. The starting point, which the head of the main body is to pass at a certain time, is fixed in operation orders. If troops are not all quartered together, it may be necessary for the commander to fix more than one starting point, so as to enable subordinate commands to take their places in the column of march punctually, without unnecessary fatigue to the troops and without crossing the line of approach of other commands. Each subordinate commander must fix his own

local starting point and the time at which the head of his command must pass it so as to be able to pass the starting point laid down by the higher formation at the hour specified. In fixing the starting point, care must be taken that each unit reaches it by moving forward in the direction of the march. Fighting troops with their first-line transport have precedence on the road over all other transport during the movement to the starting point. All movements to the starting point are calculated at the rate of 100 yards a minute.

Should a march begin in the dark, special arrangements for marking the starting point will have to be made and notified in operation orders. Lights used for this purpose must be effectively screened from the enemy.

6. The normal march formations on a road are :—

i. For armoured fighting vehicles, column of route, i.e. single file.
ii. For cavalry, column of sections, or of half-sections, i.e. four horses or two horses abreast.
iii. For infantry, column of route, i.e. fours.*
iv. For artillery, column of route, i.e. guns and vehicles in single file.
v. For cyclists, half-sections, i.e. two men abreast.
vi. For motors or other vehicles, column of route, i.e. single file.

Unless orders to the contrary are issued, troops and transport will march in normal march formation on the "rule of the road" side of a road, sufficient space being left on the outer flank for passage up and down the column. In hot or dusty weather, or for the purpose of concealment from air observation, a column may be opened out on either side of the road, the centre being left clear. The distances laid down in Appendix VI, para. 5, may be increased by order of the column commander in hot or dusty weather.

On unenclosed ground, it may be advisable to broaden the front by marching in several columns abreast. If a road is sufficiently wide, it may be possible to march a column of troops in threes or fours on each side and still leave the centre open for traffic. It is not, however, worth while to change one march formation for another, unless the latter can be maintained for a considerable distance.

* Marching by threes instead of by fours adds to the comfort of the troops, and may be adopted unless the increase in road space is a consideration. On a narrow road it may be necessary in order to allow space for passing.

7. The *average* rate of march of a large body of troops moving at foot pace may be calculated at 2½ miles an hour (although the actual rate at any given time will probably be slightly higher (*see* Sec. **22, 4**), and of a mounted column at 5 miles an hour. Other time and space calculations will be found in Appendix VI.

8. When mechanized units or vehicles form part of a column marching on foot, they should be allotted a separate route, if one is available and the tactical situation permits of its use. If they have to move by the same route, they will usually move by bounds, at the head or rear of the column or in some space in the middle of it. Mechanical transport cannot move for long distances at foot pace without waste of petrol and damage to the engine by overheating, unless the vehicles are specially designed to move at foot pace like the infantry transport vehicle. When mechanical transport does move for any long distances in an infantry column, care must be taken that distress is not caused to the marching men by fumes from the exhausts.

9. In marching columns, halts will be from ten minutes before each clock hour until the clock hour, unless otherwise ordered (*see* Sec. **43, 1**, as regards halts by protective troops). During long marches, of 15 miles or over, a halt of one hour or more is advisable if the situation permits. If a long halt is contemplated, staff officers accompanied by engineer and medical officers, with sufficient police and orderlies, will march with the advanced guard, or will, if the tactical situation permits, be sent forward, to select halting grounds near good water and to take measures for its allotment and protection.

10. Time must be allowed for animals to be watered and fed before starting a march. If an early start is necessary, it is also advisable to arrange for watering after one or two hours' marching, since animals will not usually drink in the early morning. Watering on the march may be from troughs, or if they are not available, by buckets or direct from a stream or pool. Arrangements for traffic control at a watering place are essential, and time tables prepared by the staff may be necessary. If animals are watered direct from a stream, steps must be taken to prevent general pollution of the supply. Long halts should last at least an hour if animals are to be off-saddled, watered and fed.

11. No trumpet or bugle calls are allowed on the line of march. Intercommunication throughout a column will normally be by mounted or cycle orderlies. Mounted officers, motor cars and motor cycles will avoid passing up and down a marching column more than is absolutely necessary; they can often avoid causing discomfort to the troops by taking advantage of a halt to pass.

Traffic control must be arranged at points where congestion is likely to occur. Where roads cross one another or bifurcate, arrangements must be made to place sign-posts or orderlies to guide the troops in the required direction; or the road not to be used may be blocked by some pre-arranged sign, such as branches of trees or a line of stones.

The regulation of civilian transport may require special measures, particularly if large numbers of refugees are on the move, as may happen in the event of a retreat.

12. Staff officers must have, ready for reference, statements, based on the actual strength of units, showing the length in column of route of the unit or formation with which they deal, the time it takes to pass a given point, the billeting accommodation or camping space it requires, etc.

A form of march table suitable for use with operation orders is given in Appendix VII.

22. Rules for march discipline

(*See also* Manual of Elementary Drill (All Arms))

1. Good marching depends largely on the efforts of regimental officers, who must see that a strict march discipline is observed. March discipline includes everything that affects the efficiency of man, horse or machine during the march, e.g. the arrangements for food and forage, the filling of water bottles, attention to harness and saddlery, constant inspection of the working parts of mechanical vehicles, the proper loading of transport (*see* Sec. **28**, 2), the strict observance of the correct formations and distances, and many similar details.

2. Slackness in march discipline not only causes discomfort in the unit itself, but may lead to disaster through troops arriving late or too exhausted to take an effective part in battle, or through roads becoming congested or blocked. The importance of march discipline and the necessity of maintaining a high standard in all conditions must be realized by all ranks. March discipline which breaks

down at a time of crisis is of little value: the longer and more trying the march and the worse the conditions, the more strictly must it be enforced. An officer, when available (otherwise a non-commissioned officer), will march in rear of each squadron, battery, company or other unit, to see that no man leaves the ranks without permission, that the sections, vehicles and animals keep properly closed up, and that the column does not open out.

3. Strict attention must be paid to water discipline; the less men drink during the actual march, the better; men should not be allowed to drink from their water bottles without permission. They must not be permitted to fall out for water; when necessary, halts will be made to enable men to fill their water bottles. Every opportunity will be taken to water animals on the march.

4. The rate of marching throughout a column should be uniform; an irregular pace is most exhausting, especially to the troops in rear of the column. On a good level stretch of road a pace of one mile in eighteen minutes should be maintained at the head of an infantry column.

If distances are lost, stepping out, doubling or trotting to regain them is forbidden, except by order of the unit commander. Infantry will only be ordered to quicken its pace if a defile is to be passed or some definite object is to be gained.

5. On a halt being ordered, all troops will at once halt and fall out on the same side of the road as that on which they are marching, leaving the other portion of the road clear for traffic. Dismounted troops will remove their equipment (except anti-gas respirators, or other protective equipment, when worn), and mounted troops will dismount and loosen girths; riding horses heads will be turned towards the space left clear for passing traffic. Cross-roads must be left clear.

6. No compliments will be paid during a march on service, unless specially ordered.

23. Marches by tanks and mechanized forces

1. The power of making long and rapid marches without casualties to vehicles or undue loss of energy by tank crews and other personnel is essential to the success of armoured

or mechanized forces. Strict march discipline is just as necessary as with columns marching on foot.

2. In enclosed country, a first-class road or roads should be allotted to a mechanized force. On narrow roads with high hedges or banks, a broken-down vehicle will cause serious delay owing to the difficulty of passing it or of towing it out of the way.

The peculiar marks of the tracks, which facilitate detection by enemy aircraft, do not show on metalled roads. Vibration on metalled roads, however, necessitates more maintenance, especially of medium tanks, and involves much more mechanical trouble than does soft going; on the other hand, the dust from unmetalled roads in dry conditions not only affects mechanism but causes discomfort to the crews, and imposes extra strain on the drivers.

3. When there is no possibility of contact with the enemy and the comfort of the troops is the first consideration, a mechanized force may be marched in three echelons, i.e. medium and close support tanks and mechanized artillery; light tanks; first-line transport or lorry-borne infantry. Each echelon can then march at the speed most suited to it. It is preferable that tracked vehicles, such as tanks and artillery dragons, should move across country rather than by road where the country is suitable for movement.

The normal average pace of these three echelons moving separately is: medium or close-support tanks and mechanized artillery 7 to 8 miles an hour, including halts; light tanks 10 to 12 miles an hour; lorries 12 to 15 miles an hour.

When contact with the enemy is possible, the speed of the medium tank will become the limiting factor, and the average pace of a mechanized force by day will be seven to eight miles an hour. The leading vehicle must maintain a constant speed: a speed of 10 miles an hour on the road will result in an average speed of $7\frac{1}{2}$ miles an hour including halts.

4. There will be a halt of 15 minutes in each hour; alternatively, a column may march for an hour and a half and then halt for 20 minutes. In marches of more than 4 hours, there should be a long halt of at least one hour, to allow of thorough inspection and maintenance of the vehicles, and of rest for the drivers and crews. Previous reconnaissance should always be made of the site for a long halt. Regular inspection and maintenance of vehicles at all halts is of great importance.

5. A mechanized force, such as a tank brigade, can march 50 miles a day for a limited period without undue fatigue; and can cover 100 miles in 24 hours as a special effort.

24. Rules for the movement of horsed and pack transport

1. Strict march discipline is as necessary with transport as with troops. Transport should march in small blocks, of about six horsed vehicles or the equivalent, with a space of ten yards between blocks; sufficient space should be left on the outer flank for the free movement of passing traffic; transport should be kept closed up, and any distance lost should be regained as soon as opportunity offers.

2. When possible, only one nature of transport will be allotted to each echelon or stage of a convoy route. When different forms of transport have to move together (e.g. horsed carts, camels, mules), the fastest class of transport should start first, if the situation permits of the column opening out. Otherwise the slowest class of transport should lead, so that slow-moving animals (such as camels) will not be overdriven to keep up with faster animals (such as mules). In each class of transport, the slowest moving team or animal will lead.

3. No men will be allowed to ride on transport vehicles or to place their arms and equipment on them, except by the written order of an officer.

Some empty wagons or spare animals will march in rear of the column to replace casualties; they must not on any account be used to carry excess baggage. Broken-down wagons, disabled animals or thrown loads must be removed at once from the roadway, so that the transport in rear may not be checked.

Animals must not be allowed to drink when passing through fords, unless special orders have been issued for them to do so.

4. The use of pack transport, which is confined mainly to undeveloped countries, requires special care and organization. Unless loads are properly balanced and well tied-on, an undue proportion of the animals will become casualties through sore backs, and there will be constant delays on the march through loads slipping or falling off. The loading of a large column of pack animals requires careful organization; the

loads should be prepared, balanced and laid out ready for loading before the animals are brought up; loading parties are usually required to assist the drivers. To save the animals, they should be loaded as shortly as possible before the hour of starting, and loads should, if possible, be removed at halts.

There is usually a driver to every two or three animals. Each driver should normally lead his own animals only. With camels, on easy tracks, however, it is sometimes found best for one driver to lead a string of six to eight camels, with another driver in rear; and on rough hill tracks, mules go best if not tied together but driven in bunches.

25. Rules for the movement of mechanical transport

1. Mechanical transport may move either as a single column (in convoy), or by small groups (or even by single vehicles) at time intervals. The latter method enables a given distance to be covered in a shorter time and with less fatigue to the drivers, but may not always be applicable owing to considerations of road space or of protection. The average speed of lorries with pneumatic tyres on a good road by day may be taken as 15 miles an hour if moving in convoy, and 15 to 20 miles an hour if moving in independent groups or by single vehicles. Loaded M.T. vehicles should not move at a slower pace than five miles an hour, except when passing troops, which should be done at as slow a pace as possible to avoid covering them with dust or mud, or when moving through towns, etc.

As regards pace of movement by night, *see* Sec. **79.**

2. A column of mechanical transport moving in convoy will be divided into blocks, usually of five vehicles. A regular distance must be maintained between vehicles, sufficient to allow of sudden halts without collision and to permit overtaking traffic to pass. The distance which can be maintained varies according to the type of road; on good and level roads a distance of 20 yards between vehicles and of 40 yards between blocks will be maintained on the move. At the halt there will be 2 yards between vehicles and 20 yards between blocks. Columns of lorries going up steep gradients will be allowed to open out; as soon as the head of the column has reached the top of the hill, it will slow down to allow the vehicles in rear to close up to the regulation distance. A motor cyclist should be detailed to patrol M.T. columns to ensure correct

maintenance of distances and to report break-downs or delays. There should be spare lorries and fitters to deal with break-downs at the tail of every column of mechanical transport.

3. A man should always ride in the back of the last lorry of a block, to keep a look-out to the rear and to warn the driver if overtaking traffic desires to pass; if possible, there should be a man at the back of every lorry. One man in every lorry should know the destination in case of delay by break-down.

4. If a lorry column is obliged to halt near a corner, a sentry must be posted to warn traffic; if it has to halt astride a cross-roads, a distance of 15 yards will be left clear on each side of the cross-roads. On no account must vehicles be allowed to "double bank."

5. A lorry column should not normally be turned about on a road less than 25 feet wide, and then only if there is little traffic. It is nearly always better for the column to make a complete circuit by road, and suitable turning circuits should always be taken into consideration in ordering the move of lorry-columns.

26. Movement of troops by rail

(*See also* Manual of Movement (War))

1. Movement of troops by rail in the theatre of war may be classified either as strategical or tactical. The former is applicable mainly to the concentration in a theatre of war or to the strategical move from one theatre to another of large bodies, such as one or more divisions. Formations and units move complete with animals and transport.

In tactical moves, only the dismounted personnel, with a minimum of animals and transport, go by rail; the remainder (e.g. cavalry, artillery and the greater part of the transport) march by road. Tracked machines, such as tanks, are sent by rail when possible, owing to the wear which long marches by road cause to the tracks.

2. Owing to the time required for marshalling and shunting trains and for entraining and detraining, the strategical move of large formations (a division or more) by rail instead of by road saves time only when the distance is sufficiently long. In highly developed countries, such as those of Western

Europe, the minimum distance over which movement by rail saves time is approximately 60 miles for a division or 90 miles for a cavalry division. In less highly developed countries, where railway capacity is more limited, the distances would be much greater.

The rate of troop movement by rail depends on the capacity of the railway system, e.g. whether the line is single or double, the gradients on it, the number of entraining and detraining points available, and so forth. Even on a highly developed system, a rate of 24 troop trains in 24 hours can rarely be exceeded; and since over a long programme an average of 3 hours between trains may be required at each entraining and detraining point, it is necessary to use at least three separate entraining and detraining points in order to reach this maximum. A division on a broad gauge with normal gradients requires about 40 trains. The average running speed of a troop train is from 17 to 20 miles an hour.

3. Tactical movements by rail are made to secure surprise, to transfer troops rapidly to a threatened point or to save them from fatigue when roads are congested or the weather bad. Their use is limited by the fact that formations are separated for a time from their artillery and a large part of their transport.

4. Trains employed in moving troops are of two distinct types :—

i. The train is made up to suit the composition of each unit to be entrained.

ii. A standard type of train is used for all units, except units such as tanks or heavy artillery which require special types of trucks.

The first method, which is the normal British practice, gives greater comfort to the troops and enables units to be kept together better; but the second method, which is largely used on the Continent, is more economical of rolling stock and enables moves to be initiated with the minimum of notice, since trains of standard type can be made up and kept ready in sidings.

5. The general procedure for all movements by rail is that the general staff issue the executive orders for the move, the detailed arrangements being made by the Q.M.G.'s branch of the staff. ~~Movement control~~ officers are appointed at entraining and detraining stations as representatives of th

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11. Pages 52 and 53. Section 26, paragraph 5, lir
paragraph 6, lines 1 and 4, and paragraph 7, lin
For "*movement* control" *substitute* "railway traffi
in each case.

movement section of the Q.M.G.'s branch of the staff, and are the intermediaries between the troops using the railway and the technical authorities responsible for the working of the railway.

6. If there is no ~~movement control~~ officer at a station where troops are to entrain or detrain, it is the duty of the Q.M.G.'s branch to appoint an officer to carry out the duties of ~~movement control~~ officer and to provide him with the necessary instructions.

7. The responsibility for entraining and detraining a unit lies with its commander, but he will be guided as to local requirements by the ~~movement control~~ officer. The rules for entrainment and detrainment given in King's Regulations will be followed except where they are clearly inapplicable to war conditions.

A table suitable for the entrainment of an infantry brigade is given in Appendix VII.

8. The senior combatant officer in a troop train is in command of the train and is responsible for all measures of protection. If air attack is possible, anti-aircraft light machine guns will be mounted in open trucks for defence against low-flying aircraft.

27. Movement of troops by mechanical transport

1. A distinction must be drawn between the use of mechanical transport for the movement of troops on the lines of communication or behind the fighting line, when the area in which the move is to take place is already protected by the disposition of our own forces; and its use in the forward zone to give additional tactical mobility to dismounted troops, either as part of a mechanized force or for some particular operation.

2. In the former category may be placed the use of mechanical transport for troop movements on the lines of communication in areas ill-provided with railways, or, in position warfare, for the withdrawal of exhausted units from the battle line, for the transfer of reserves or for the carriage of troops, such as labour units, whose marching powers are limited. In such moves mechanical transport is used simply as a substitute for a railway train, and is subject to the same limitation as tactical trains (Sec. 26, 1) in that, as the troops

are separated from their artillery and transport, the distance of the move should not exceed two days' march for the transport. As compared with a train, a bus column is less economical, congests the roads, has a much smaller carrying capacity and provides less comfort. It has, however, the great advantage of flexibility, as it can go wherever a suitable road exists. The advantages and disadvantages are in fact similar to those of the railway and motor transport in civil life.

When sufficient mechanical transport is not available to carry all the troops to be moved, a combination of marching and carriage by mechanical transport may be arranged.

A troop move by mechanical transport requires careful preparation and staff work in the same way as a move by railway train. The arrangements required are dealt with in paras. 5 to 9, below.

3. Moves by mechanical transport in the forward zone, when the location of the hostile force is unknown and the troops carried may be required at any time to debus and engage the enemy, require special arrangements for reconnaissance and protection, without which a long column of mechanical transport is very defenceless to attack from the ground or from the air. An advanced guard of armoured fighting vehicles is usually required, as well as special measures to safeguard the route along which the column is moving against attack from the flanks (*see* Sec. **39**). Further, since it will usually be necessary when the enemy is met to debus the troops and to move the vehicles to some area of concealment in rear, and since it is seldom possible to reverse the vehicles on the road, the mechanical transport column should move by bounds between road circuits where the direction of movement can easily be reversed; not passing beyond one circuit until the next circuit is reported clear by the advanced guard.

4. The vehicles used may be passenger-carrying coaches or omnibuses, requisitioned from civilian use, with a capacity of up to 30 or more men, or lorries. A 5-ton lorry will normally carry 20 fully-equipped men, besides the driver; a 30-cwt. lorry 15; and a 15-cwt. lorry eight. Allowance should be made for any machine guns, bicycles, signal equipment, S.A.A., etc., to be carried; when buses are used, some lorries should accompany the column for this purpose, if available.

Mechanical transport which already has a definite purpose, such as the divisional baggage company, should only be employed for the carriage of troops in circumstances of extreme urgency, since the normal functioning of the administrative services is thereby upset and great discomfort may be caused to the troops. If special bus units are not available, reserve transport companies may be used.

If infantry is to form part of a mechanized force, or is frequently to be moved by mechanical transport, its first-line transport must be mechanized and must be capable of accompanying a column of lorries or buses. Small cars must be provided for mounted officers, or their chargers must be carried in motor horse-boxes.

5. Points for embussing and debussing require careful selection, and should, whenever possible, be previously reconnoitred. A long straight stretch of road with room at the sides for troops to form-up, is the ideal from the point of view of convenience in embussing and debussing. Concealment from air observation will, however, usually be of first importance, and may require the use of several places widely separated.

6. The formation to be embussed will be divided into unit groups and the vehicles will be divided accordingly, each vehicle (except spare vehicles) being numbered. The leading vehicle of each group will be marked by a distinctive flag and a similar flag will mark the point where it is to draw up. Vehicles will be drawn up in blocks of five (occupying 60 to 70 yards) with 20 yards between blocks. The forming up of the vehicles will probably take from 15 to 20 minutes. Unit groups will be told off into parties for each vehicle, each party being given the number of the vehicle in which it is to embus. A suitable table on which this may be done is given in Appendix VII. Troops should, if possible, reach the embussing point and be told off into parties before the vehicles arrive. Orders will be issued whether the troops are to remove their equipment or not.

7. The actual embussing may be done by one of two methods, depending on the facilities for concealment and the length of road suitable. In one method the unit or formation is deployed along the road, in the correct groups and parties, suitably flagged; the vehicles draw up accordingly, and simultaneous embussing of the whole unit or formation can take place. This is the quickest method, but requires a long

stretch of road (about 600 to 700 yards for a battalion), and makes concealment difficult. In the second method, a shorter length of road is used successively by a smaller number of vehicles, in the same way that a length of platform might be used by successive trains; the troops can be kept in concealment and moved up to the " platform " in parties, as required. This method is slower and complicates control of the column, unless it is moving by time intervals (Sec. **25**, 1), but makes concealment easier, and is often the more suitable one.

8. The route should be carefully selected and reconnoitred; and should be marked or piqueted wherever there is a possibility of mistake; a wrong turning by a lorry column may mean very serious delay, since it is not easy to reverse movement. Steep hills or narrow roads may also be a cause of great delay and should be avoided, if possible. It will often save time and spare the drivers fatigue to select a good main route even though the distance be greater.

The rules for march discipline given in Sec. **25** apply, of course, to the movement of troop-carrying vehicles.

9. Much the same considerations govern the choice of the point of debussing as of the point of embussing, i.e. facilities for concealment from the air, a suitable stretch of road and a good position of assembly for the troops. In addition, there should be near the point of debussing a turning circuit for the vehicles. The orders for a move by mechanical transport should always contain instructions for the disposal of the vehicles after the debussing of the troops.

10. The commander ordering a move by mechanical transport will appoint an officer to command the column, who will be the deciding authority on all questions. He will be responsible for the protection and guiding of the column, for any alteration in the route laid down, for the regulation of halts, for intercommunication in the column, for the decision whether to use headlights or not, and all similar matters. He will give the order for embussing and debussing and the signal for halts. If he is the senior officer of the troops being moved, as he will usually be, he will consult the senior R.A.S.C. officer on all matters affecting the proper working of the transport, will avoid all interference with his technical functions and will give effect to his technical requirements, unless he considers that by so going he will endanger the safety of the column. He will usually travel in a car with the R.A.S.C. officer in command of the transport, who will

be responsible for the march discipline of the column, for regulating the pace, for technical control, for dealing with break-downs, etc. The commander of a group in a column will travel on the driver's seat of the leading vehicle of his group; he will distribute his officers evenly throughout the vehicles of his group and will ensure that all officers are acquainted with the destination and route.

28. Rules for the passage of bridges and defiles

1. A staff officer will usually be detailed to supervise the passage by a column of an important bridge, defile or obstacle. This officer will issue any orders necessary for change of formation, will regulate the flow of traffic and will make any arrangements necessary for the further action of units on the far side of the obstacle. An officer of each unit will remain on the near side of the bridge, defile or obstacle to control the movement of the unit until the whole of it has passed. It is important to ensure that large numbers of troops and transport do not assemble in an exposed position awaiting the passage, and so provide a target for enemy artillery or aircraft. Congestion at a bridge or defile may be avoided by a distant traffic control post at a point where suitable cover exists, in telephonic communication with the bridge or defile.

Where engineer work on the passage is necessary, the staff officer will issue his orders in co-operation with the engineer officer in charge of the work. The responsibility of the engineer officer for the crossing arrangements extends only between the extreme limits of the bridge, or between the banks of the river when the crossing is by raft or ferry.

2. The classification of military bridges is given in Appendix VIII. Since each type of bridge is designed to carry a specified load, careful arrangements are necessary to prevent the passage on to the bridge of any load greater than that which it is designed to bear. Unit commanders are responsible that the normal loads of vehicles are not exceeded. The engineer unit which constructs the bridge is responsible for the posting of notices showing the class of traffic for which the bridge is designed and any precautions that must be observed, such as the speed and spacing of heavy vehicles or the necessity for infantry to break step. At important crossings it will usually be necessary for formations to post a responsible officer to ensure that these precautions are observed.

The maintenance of a bridge remains the responsibility of the engineer unit which constructed it, until further orders are issued.

29. Movement of troops by air

1. Small forces of infantry with light machine guns and supporting weapons can be moved by air to a point several hundred miles away in a few hours, if suitable aircraft are available and secure landing grounds exist. This power may be of the greatest value in an emergency, particularly in countries where other forms of transport are slow and undeveloped. Aircraft may also be used for the evacuation of casualties, where ground communications are long or bad, or for the maintenance of small columns or garrisons with ammunition or supplies, which can be dropped from aircraft by means of parachutes.

2. The present limitations of air transport must, however, be fully realized. The numbers of suitable aircraft (i.e. bomber-transport squadrons of the R.A.F. or large civil passenger aircraft) are small: their capacity is from 12 to 24 fully armed and equipped men; their effective range may vary from 200 to 500 miles, according to the type of aircraft, the geographical conditions (especially the altitude of landing grounds) and the state of the weather. Troops carried by air will be without means of transport on arrival, unless arrangements can be made to provide it at their destination.

3. When a move by air is decided on, the air force will inform the army of the number of aircraft available, the place of emplanement and deplanement, and the total weight in pounds avoirdupois which is available for the army in each aeroplane. The unit concerned will then tell off the troops into batches for each aeroplane, and will prepare a statement showing the total weight of each party and of everything that they are taking with them.

If the troops are likely to have to go into action immediately on arrival, tactical unity must be preserved to the greatest extent possible; complete platoons cannot usually be kept together, but sections must be kept intact as far as possible, and men of different companies must not be mixed. If there is no likelihood of immediate action, the importance of utilizing all the weight available is the ruling factor, and the mixing of sub-units is less objectionable.

Battalion and company headquarters will always be distributed between several aircraft, so that in the event of a forced landing of one aeroplane the whole of a headquarters will not be separated from its command.

4. The orders for a move by air should include instructions for precautions against fire, for the control of movement during flight, for action in the event of a forced landing and for the provision of rations, water, and medical aid. Where moves by air are frequently undertaken, many of these instructions will form part of standing orders.

5. The senior army officer will be responsible for the protection of the place of emplanement and deplanement. The senior officer, whether army or air force, will be responsible for all other matters affecting the two Services on the ground at the place of emplanement or deplanment, including the safeguarding and issue of rations and water. He will, however, consult the senior representative of the other Service before issuing orders. The responsible air force officer will give orders to emplane or deplane to the officer or non-commissioned officer in charge of each party. During the flight troops will be under the orders of the senior pilot in charge of the aeroplane and the air force will be responsible for protection in the air; but should a landing be made, the senior army officer or non-commissioned officer will be responsible for protection from the time that the aeroplane is safely on the ground.

30. Quarters in the field

(*See also* Field Service Regulations, Volume I, 1930, Chapter XVI)

1. Quarters in the field are either billets, close billets, camps, huts or bivouacs; in position warfare, also dug-outs and trench shelters.

Billets are the usual form of quarters in civilized countries for forces not in close touch with the enemy; they give the best shelter and rest and also provide concealment from air observation. Their chief disadvantage is that they cause dispersion, so that rapid action in an emergency may be difficult, and that discipline is not so easy to maintain. This disadvantage of dispersion may be overcome by *close billeting*, when as many men and animals as possible are placed under cover in buildings, while the remainder bivouac close at hand.

Bivouacs mean concentration and readiness and enable the most favourable dispositions of the troops to be made from the tactical point of view, but they are trying to the health of men and animals in cold or wet weather.

Camps or *huts* are healthy and can be sited to meet tactical and administrative requirements, but they require time to erect or construct, and can usually be used only in base areas or in conditions of static warfare.

Trench shelters and *dug-outs* are used in position warfare: their prolonged occupation is detrimental to health, morale and discipline.

2. In the presence of an enemy, tactical considerations, e.g. favourable ground for deployment, concealment from observation, cover from air attack or bombardment, economy in outposts, will determine the type of quarters to be occupied. Otherwise, the health and comfort of the troops is the first consideration, though the possibility of attack from the air will usually have to be taken into account. The arrangements for protection when at rest are dealt with in Chapter V

CHAPTER IV

INFORMATION AND RECONNAISSANCE

31. Information—general

1. The information at his disposal is the basis of any plan made by a commander in the field; a summary of this information is usually communicated at the beginning of the order which puts the plan into execution (Sec. 15, 4); the more accurate and complete the information, the more likely is the order to be appropriate and the plan to succeed. To make the best possible arrangements to provide himself with information—of the position and state of his own troops; of the numbers, moves and intentions of the enemy; and of the conditions of topography and weather likely to affect his plans—is therefore an essential duty of every commander, from the highest to the lowest.

To obtain up-to-date information of one's own troops is mainly a matter of good intercommunication. Besides its location, a commander should know the condition of each body as regards fatigue and morale, so as to be able to judge what further efforts may be expected of it.

Information about the enemy can never be complete, nor is it likely to be entirely accurate or up-to-date, however good and careful the arrangements to obtain it. A commander must realize that he will usually have to act on imperfect knowledge of a situation; it is his business to seek continually by every means in his power to supplement, confirm or correct his information; but to postpone action, when action is required, on the plea of waiting for fuller information, will lead to the loss of valuable time and the risk of failure.

During the course of a battle, it is usually extremely difficult to ascertain the situation in the forward zone; the front line troops are too busy fighting to be able to report continuously, and the arrangements for intercommunication are subject to delays and interruption; a commander in

rear should make provision for obtaining information independently of reports from the troops actually fighting—by observation posts, by special reconnaissances, through liaison officers or non-commissioned officers. He should in fact send forward to obtain information, not be content to wait for it to come back from the fighting troops. This, however, in no way absolves the fighting troops from making every effort to obtain and send back information.

Commanders of forward units, such as platoons and companies of infantry, should be trained to send back frequent situation reports giving the location of their own commands and of neighbouring troops and information of the enemy. Artillery observing officers, who are well placed to acquire information, must not confine their reports to matters concerning the artillery, but must send back all information which may be of value.

Commanders should be cautious in accepting the statements of stragglers and wounded from the front line; they are often exaggerated and unduly pessimistic.

Topographical information is obtained in the first instance from maps, and the ability to read a map properly, i.e. to visualize the ground and its tactical properties, is a great saver of time and a quality which every commander must cultivate by practice. An eye for a map is quite as valuable as an eye for ground. But the information acquired from a map must be supplemented whenever possible by personal reconnaissance or from the reports of reconnoitring detachments or from air photographs.

Forecasts of the weather are often of importance: the possibility of fog or mist may determine the hour of an attack or affect the arrangements for defence; the direction and strength of the wind govern the use of smoke or the possibility of the enemy employing gas. A meteorological section is usually attached to the headquarters of a large force in the field.

2. The principal sources of information in the field are: air reconnaisssance and photography; reconnaissance to a distance by mobile troops; actual contact with the enemy and identification of his units obtained by fighting; observation from the ground of the enemy's dispositions; interception of enemy wireless messages; interrogation of prisoners or of civilian inhabitants; captured documents, etc.

Of the above, air reconnaissance enables information of the enemy's movements and of the topography of the country

to be obtained to a great depth with the least delay; it is, however, subject to certain limitations by weather and by the nature of the country, and cannot produce the detailed information necessary for tactical plans. Air reconnaissance of the forward enemy area must therefore always be supplemented by ground reconnaissance.

The information and identifications obtained by actual contact are, from a tactical point of view, the most valuable of all, and form the principal basis of any tactical plan. Thus, while strategical information is gained principally from the air and from reconnaissance by mobile troops, tactical information is in the main the responsibility of the forward troops of all arms. Much useful information, both topographical and of the enemy, can be gained by the questioning of civilian inhabitants; it may sometimes be advisable to send an interpreter with reconnoitring detachments.

Information from enemy wireless may be of the utmost value if the messages can be deciphered in time or if the enemy is imprudent in sending messages in clear. The possibilities of the enemy attempting deception by wireless have, however, always to be borne in mind.

The information derived from the interrogation of prisoners, from the examination of captured documents, etc. is usually too late to affect the immediate operations, but is most valuable in enabling the intelligence staff to obtain a general picture of the enemy's organization, dispositions, morale, etc.

3. The value of information depends on its relevancy, i.e. its bearing on the operation in hand, its accuracy and its timeliness. Whether information is relevant or not will depend largely on the instructions given by a commander to his reconnoitring detachments (*see* para. 4, below); whether or not it is accurate on the skill of the reconnoitring detachments; and whether it arrives in time or not on the arrangements made for its transmission. The transmission of information often presents greater difficulties than its collection. When the reporting agency cannot guarantee the accuracy of a report from personal observation, the source of the information must be given, and the degree of accuracy attached to it.

Negative information, i.e. information that nothing was seen of the enemy at a certain time in a certain place, is often of great value: the instructions given to a reconnoitring detachment should enable it to judge whether and when negative information is of importance. Negative

information from the air, however, often requires confirmation from other sources. (*See* Sec **32**.)

4. A commander will usually obtain from a reconnaissance the results which the clearness and appropriateness of his orders for it deserve. The information required should be put in the form of definite questions to be answered, in order of priority; the time by which each answer is required should be given when practicable. The commander of the reconnaissance, or of the air unit concerned, should be given all available information of the enemy and such information of the intentions and movements of our own troops as may be necessary for the appreciation and performance of his task. He will then be able to judge the relative value of the information which he obtains and to report immediately news which he will realize is of vital importance for the plans and dispositions of the higher commander. It is desirable that the commander sending out a reconnoitring detachment, or his staff officer, should, whenever practicable, give instructions personally to the actual commander of the detachment, and should examine him on the results of his reconnaissance on his return; in air reconnaissance this is normally done by means of air liaison officers with the air force (*see* Sec. **32, 4**).

Detailed instructions for the conduct of reconnoitring detachments and patrols will be found in the manuals of the various arms.

5. It is the duty of a commander to co-ordinate all the means of obtaining information at his disposal in a well-thought-out reconnaissance plan, without which there will be much waste of time and effort. The plan should be directed towards the economical use of all methods available by a careful allotment of tasks. A process of elimination will sometimes be necessary; for example, aircraft may indicate the most likely areas where enemy forces may be lying up in concealment; these areas can then be searched by armoured cars, cavalry or infantry, according to distance.

6. In all units and formations certain personnel are charged with the duty of collecting and sifting all information gained; of distributing it as required, both upward and downward and to units and formations on the flanks; and of presenting to the commander a clear picture of the situation which will assist him to frame his plans. In a battalion, for example, the battalion intelligence section performs these

duties. Detailed instructions for intelligence work will be found in the Manual of Military Intelligence in the Field.

All ranks must, however, be taught that the collection of information is not the business only of the special intelligence personnel, nor only of reconnoitring or observing detachments. Every individual soldier must be restlessly inquisitive in the quest of information and must report to higher authority anything that he observes. Military intelligence in the field is built up from many small items of information, often apparently trivial, and requires the continual co-operation of all ranks. If the enemy is using gas, information of his methods, specimens of his protective equipment, splinters, fuzes, etc., of gas shells, will be of great importance.

32. Air reconnaissance

1. Air reconnaissance is classified as strategical and tactical. It begins before the opposing armies are in contact, and, at the opening of a campaign, is directed towards discovering the enemy's initial concentration areas, his lines of forward movement by road and rail, the position of his depots, camps and aerodromes, and so forth. This is *strategical reconnaissance*, and is usually carried out by day bomber squadrons, either by single aeroplanes flying at a great height (up to 20,000 feet) and relying on evasion for their security, or, if the enemy's air opposition is serious, by a number of aeroplanes flying in formation. Aircraft carrying out strategical reconnaissance usually work under the orders of G.H.Q. and make use both of photography and of direct observation. Two-way W/T. communication can be carried for reporting urgent information.

As the opposing forces approach each other, more detailed information is needed concerning the enemy's advance and deployment, and of the movement of his mobile forces or other detachments: as contact is gained and the battle develops, very detailed reports are required as to the enemy's battle dispositions and, on occasions, the positions reached by our own forward troops. All this is *tactical reconnaissance* and is usually carried out by army co-operation squadrons, working under the orders of corps or divisional commanders. It is impossible to define where strategical reconnaissance ends and tactical reconnaissance begins. Tactical reconnaissance is sub-divided by using the terms " medium " and " close " to indicate the type of patrol required, its duration

and distance and, therefore, the methods of control and intercommunication which are best employed. As a very general guide, the limit of close reconnaissance is usually about 15 to 20 miles in advance of our forward troops, medium reconnaissance may extend up to about 75 miles and strategical reconnaissance up to the limit of the radius of action of the aircraft employed.

During actual battle, continuous reconnaissance during the hours of daylight is usually required, at any rate until the situation has become stable and the enemy's general dispositions are known; it must be remembered, however, that, as the duration of such a reconnaissance flight is about two hours, the observer changes every two hours. Aircraft employed on close reconnaissance are equipped with R/T., efficient up to a range of about 50 miles, for communication with the headquarters of the formation controlling them.

Another form of tactical reconnaissance is reconnaissance carried out for the needs of the artillery. Artillery reconnaissance is required from the moment when the enemy comes within artillery range and throughout the battle period; its object is the location of targets for the artillery and the direction of fire on to them. The information obtained by aeroplanes engaged on artillery reconnaissance is also often of great value to the other arms, and supplements or confirms the information from close reconnaissance aircraft. Communication is by W/T. from the air and by R/T. or ground strips from the ground.

2. Air reconnaissance has certain limitations. Firstly, as to weather: fog and falling snow may prohibit reconnaissance altogether, while ground mist, haze or low cloud may greatly restrict visibility. Secondly, air observation cannot be relied on for detailed information: the movements of small bodies will escape attention; friend cannot usually be distinguished from foe; villages, woods and other cover cannot definitely be reported clear.

Aircraft can fly and reconnoitre by night, but visibility at night varies greatly according to the weather and the phase of the moon. Railway movement and large bodies of troops on main roads may be seen under favourable conditions, but little detailed information is likely to be obtained without the use of parachute flares, of which an aeroplane can carry only a small number. Flares will enable pilots to give

definite information about definite points (e.g. cross-roads) at definite times. Reconnaissance by night may have considerable moral effect on the enemy, as he will be uncertain whether movements on the secrecy of which his plans may depend have been discovered or not. Night reconnaissance will of course reduce the amount of work which squadrons can perform by day.

3. Air photography is a most important part of air reconnaissance, since it forms an accurate record of a certain area at a certain time, and will under expert examination reveal details not apparent to an air observer. Its effectiveness is, however, dependent on favourable conditions of light and weather. An aeroplane engaged in photography of an area offers a good target to anti-aircraft artillery, since it may have to fly in straight lines at a fixed height. This fact may limit photographic work of large areas, when enemy anti-circraft guns are active.

Air photographs are of two types, vertical and oblique. The former, which show the ground as seen from directly above, are most generally useful; but obliques, which are panoramic views taken usually from low heights, are much easier to read and are of great value to the forward troops in supplementing their maps and giving them an idea of the ground over which they have to operate. The time taken to develop, print and annotate photographs is a limiting factor in the use of air photography for tactical information during actual contact. (*See* Employment of Air Forces with the Army in the Field, 1932, Sec. 32.)

The air force is responsible for taking, developing and printing the photographs, the army for their plotting, interpretation and distribution.

4. The results obtained by air reconnaissance will largely depend, as in all other forms of reconnaissance, on the clearness and suitability of the orders issued by the commander who details the reconnaissance; also on close liaison between the air force and the intelligence staff of the formation concerned. Two army officers, *air liaison officers* (A.L.Os.), are attached to the headquarters of each army co-operation squadron, with the duties of supplying to the squadron officers the detailed information which they require in order to carry out their task; of interrogating the pilots on their return and investigating their reports; and of ensuring that the information obtained is communicated rapidly to the formations

or units concerned. (*See* Employment of Air Forces with the Army in the Field, 1932, Sec. 32.)

Air observers are trained to report only what they see, never to make deductions. The air liaison officers may be able to make deductions of the enemy's movements from the observations reported by successive pilots.

33. Reconnaissance from the ground

1. Reconnaissance from the ground may be classified as strategical or tactical according to whether the opposing forces are within striking distance or not. In countries suitable for the free movement of mechanical vehicles, strategical reconnaissance is likely to be entrusted to them; armoured cars will be particularly valuable, since their mobility and range of action enable them to penetrate rapidly into distant areas where information is to be sought.

Cavalry may also be used for strategical reconnaissance, particularly in areas unsuited for mechanical movement, but will more usually be reserved for tactical reconnaissance, since their greater power of dispersion and concealment makes them more suitable than mechanized troops for obtaining the detailed information required for tactical plans. When the opposing forces are close together or in actual contact, the duties of tactical reconnaissance will fall mainly on the infantry and artillery. Skill in reconnaissance is important for dismounted as well as for mounted troops.

2. Reconnaissance for the purpose of protection, i.e. to guard against surprise, is the duty of every commander at all times (*see* Sec. 37). Between special reconnaissance for information and reconnaissance for protection only there is this difference, that the reconnoitring detachment sent out for the special purpose of gaining information must base its movements and actions on the movements of the enemy force of which it seeks information, and need keep touch with its own main body only so far as is necessary to communicate the information obtained; whereas the detachment reconnoitring for protective purposes must always keep touch with the body from which it is sent out. The first duty of the former, in fact, is to make and maintain contact with the enemy; of the latter, with its own main body: the one may be likened to a detective, the other to a policeman. It is an axiom that a body of troops must never be

charged with a mission of special reconnaissance and one of protection at the same time.

3. A detachment sent out to gain information should avoid fighting as far as possible; it should fight only to the extent to which fighting is necessary in order to ensure getting and transmitting the information required. Reconnaissance means dispersion, in order to search widely, while fighting means concentration, in order to gain superiority over the enemy. Thus the formation adopted by a reconnoitring detachment is usually that of a number of small patrols pushed forward over a wide front with a larger formed body in rear ready to support the patrols and to collect the information they obtain. The formation is like a hand with fingers outstretched, the finger-tips representing the advanced patrols and the hand the supporting body; the clenched fist may be taken to represent the detachment when fighting becomes necessary.

As one force approaches another, the reconnoitring troops which both have probably pushed forward are likely to come into collision, each striving to defeat the other and so to obtain in the area between the two forces a control that will facilitate the quest for further information. There may still, however, be opportunities during this period for reconnoitring patrols, pushed wide round the flanks, to gain information of the enemy main columns behind. No reconnoitring body, large or small, should ever forget that its main object is information.

4. The strength and composition of a reconnoitring detachment requires careful consideration and calculation. It should be as small as possible; its actual size will depend on the number of patrols to be furnished, the probable number of messages to be sent, the likelihood of having to overcome resistance, and the duration of its mission. The use of wireless telegraphy will often enable personnel for carrying messages to be reduced.

5. A reconnoitring detachment which obtains news of an important or unexpected development should, besides reporting it to the commander who ordered the reconnaissance, communicate it also to any other commanders who are nearer to the enemy and may be more immediately affected by it; this may be done by ordering the bearer of the report to show it, on his way to his destination, to commanders other than the one to whom the report is addressed, or by

sending duplicate messages to those commanders by other means. The commander to whom the report is addressed should be informed, in either event, that the report has already been communicated to those other commanders.

Information of the presence of hostile armoured units should be reported to the nearest artillery with the least possible delay.

6. Personal reconnaissance of the ground over which he has to operate is the duty of every commander in his degree; the smaller the formation or unit, the more detailed the reconnaissance required, so far as time permits. The time available for any operation of war is limited, and sufficient time for detailed reconnaissance by the lower commanders can only be made by foresight and anticipation on the part of the higher commanders. A commander, in making a plan, must always take into his calculations the time necessary for reconnaissance by his subordinates; if he decides that, owing to the pressure of events and the need to forestall enemy action, the operation must be hurried on without due allowance for reconnaissance, he must realize the risks thereby incurred; good maps and good map-reading, however, will to some extent minimize these risks, and use can sometimes be made of photographs from the air, particularly of obliques.

34. Information from prisoners, captured documents, etc.

1. The detailed examination of prisoners is the business of the intelligence staff. It should take place as soon as possible after capture, before the prisoners have had time to recover from the strain of battle and to invent stories. Preliminary interrogation by the unit which makes the capture should be limited to identification of the enemy unit or units and to questions of immediate concern to the commander on the spot. Identifications are of great importance and urgency, since they usually give the most certain clue to the enemy's dispositions; they must be reported without delay to higher authority by "emergency operations" messages.

Prisoners of war must be searched for documents immediately after capture to prevent their destroying information of value. No attempt should, however, usually be made by the unit to examine documents; they should be placed

in a sack and given to the escort, who will, as early as possible, hand them over, together with the prisoners, to the provost establishment at the divisional collecting point.

2. Identification of enemy units from their dead is also important. Identification may be obtained from their uniforms, identity discs or other marks on their clothing and equipment. It is the business of the intelligence staff to communicate to the forward troops the best means of identifying enemy units.

Documents, letters, etc., should be collected from enemy dead only by the intelligence staff or under their supervision.

3. Troops engaged in reconnaissance will bring in any civilian who appears likely to be able to give useful information; the detailed examination of civilians, as of prisoners of war, should usually be carried out by the trained personnel of the intelligence staff.

When a town, village or other place lately in occupation of the enemy is entered by our own troops, all documents, printed matter, letters, etc., likely to provide information must be collected and examined. This is the duty of the intelligence staff, but it is the duty of the forward troops to occupy at once the places or buildings where such documents are likely to be found, e.g. old enemy headquarters, signal offices, post and telegraph offices, police stations, municipal offices, etc. in order to safeguard documents and records and prevent their destruction.

35. Reports and sketches in the field

1. An officer carrying out a topographical or other reconnaissance must plan it with the same care as any other operation of war. He should take the following successive steps:

i. He should make certain that he understands the object of the reconnaissance and his orders, that he has been given all the information that he requires and that he is quite clear what questions he has to answer in his report; he should divide these up under suitable headings.

ii. Before starting, he should study the map, get as much information from it as possible, plan an itinerary in conformity with the time available and look for suitable view points.

iii. He should decide in outline what form his report should take, and whether a sketch or plan will be required to supplement the map on any particular points.

iv. He should make sure that he has got all the implements that he requires, e.g. field glasses, compass, notebook, ruled paper for sketching, pencils, etc.

v. During the reconnaissance, he should keep his object and orders constantly in mind; and, so far as possible, put himself in the position of the commander for whom the reconnaissance is being made.

2. The essentials of a military report are clearness, conciseness and accuracy. The information in it should be precise and definite; vague or ambiguous expressions must be avoided. Thus "a fairly wide stream," "a large quantity of forage" may mean anything; if exact figures cannot be given, an approximation should at least be made, e.g.: "a stream about 20 feet wide," "about ten tons of hay." It is more important that the information in a report should be relevant and accurate and that it should arrive in time to be of use than that the report should be elaborate. A report should contain no information already available from other sources such as a map, but negative information or information confirming something already obtained is often of value.

Reconnoitring officers must remember that reports in the field often form the basis of a plan or movement so that inaccuracies may have serious military consequences.

3. The clearness of a report depends much on its form and arrangement. A long rambling statement in narrative form is difficult to grasp and inconvenient to refer to.

The following rules will assist to make a report easily readable:—

i. The report should be headed with the subject of the report and the name of the officer making it, e.g.:
"Report on the suitability for mechanical transport of the route from X to Y, by Lieut. Z."

ii. A margin should be kept on the left-hand side of the body of the report; the headings of the paragraphs should be written in this margin, and underlined; all paragraphs should be headed and numbered.

iii. Reports should be signed (giving rank and unit), dated and, if necessary, timed.

Reports in the field have often to be read by a tired man in a bad light; therefore they must be easily legible; all names of places should be printed in block capitals.

4. A guide as to the headings which may be required in various types of report is given in Appendix IX and in the Field Service Pocket Book. Common sense will be the best guide as to what headings are required and what are not. It is most useful to attach a short summary, containing the essential information in tabloid form, at the beginning of all except very short reports: this summary should not usually take up more than a page of an ordinary note-book.

5. When the accuracy of a piece of information cannot be personally verified the sources of it should always be given and the degree of reliability attached to it, e.g.: "this distance was given by several villagers, questioned independently, and is considered accurate."

6. A rough sketch or plan is often useful to illustrate a report: clearness, accuracy and relevance are the essentials, not artistic effect. Panoramas or thumbnail sketches are also occasionally of value, but require some knowledge of drawing; the temptation which may beset a good draughtsman to embellish a report with neat but not specially relevant drawings must be resisted.

36. Precautions regarding information

1. To take every precaution that may prevent the enemy from gaining information is the responsibility of all troops and not merely of the intelligence staff. If all ranks strictly observe the rules for security which are outlined below, one of the most valuable sources of information open to the enemy will be closed. It must be the constant care of all ranks to prevent leakage of information through carelessness or indiscretion.

The principal sources of leakage are:—

i. Indiscreet conversation of officers or soldiers, e.g. discussion in public places or in the presence of any stranger of topics directly or indirectly connected with the campaign; or the disclosure, even amongst themselves or in the family circle while home on leave, of impending movements of themselves, their unit or their friends.

ii. Evasion of the rules for censorship of private correspondence.

iii. Carelessness in carrying into action orders or official documents, or maps marked in such a way as to convey information; only those absolutely indispensable should be taken into action and should be destroyed when there is a risk of capture; the same applies to any private letters, private diaries or other papers which may give indications of the position of the unit or of the state of affairs at home or other information of value.

iv. Failure in safeguarding documents, ciphers and other secret or confidential papers in offices, camps or billets; omission to burn drafts of orders, spare copies or similar papers. *All* litter should, whenever possible, be destroyed before billets, camps or bivouacs are left.

v. The careless use of wireless telegraphy or telephony or of line telephony within range of enemy listening sets. (*See* Sec. **19.**)

2. One of the most fruitful sources of intelligence in the field is the information which may be obtained from a prisoner of war. Every soldier must be instructed that, under international law, he is bound to give only his true name and rank or army number; to give further information may prejudice the success of operations and endanger the lives of comrades; on no account must he state the unit, branch or formation to which he belongs or to answer questions about his uniform or badges. He should be warned that the enemy, in addition to direct questioning, is likely to employ artifices such as listening apparatus or bogus prisoners to overhear the conversation of prisoners and thus to gain information.

3. It is often difficult for commanders, when making plans, to know how much to make known to subordinates and what to conceal. Over-concealment tends to prevent intelligent co-operation; on the other hand, if plans and intentions are communicated a long time in advance, the enemy may gain information of them from prisoners or by spies or other means. As a general rule, officers of all grades must remember that unity of effort can only be obtained if subordinates, who may have to act on their own judgment,

are given, in sufficient time to enable them to make all necessary preparation, such information as will ensure their full co-operation in the execution of the plan. If a commander can rely on the discipline of his troops to observe the precautions in paragraphs 1 and 2, above, he can discuss his plans with subordinates sooner and more freely, and can thus further co-operation.

CHAPTER V

PROTECTION

37. General principles of protection

1. By protection is meant the measures which a commander adopts to safeguard his command against being surprised and to conceal his dispositions from the enemy; it includes precautions against observation and attack from the air and against the risk of gas attack by an enemy, the special measures necessary for which are dealt with in Secs. **38** and **40** respectively.

Every commander of a body of troops is at all times responsible for its protection; this applies equally to a division under a major-general and to a patrol under a lance-corporal. The use of aircraft and armoured fighting vehicles in war has greatly extended the area over which protection has to be maintained. Thus the lines of communication and areas behind the fighting front are now liable to reconnaissance and attack from the air at all times, and may in conditions of open warfare be also liable to attack by mobile troops. No body of troops can be regarded as secure unless protection is furnished in all directions from which attack is possible, whether from the front, the flanks, the rear or the air.

2. Adequate and timely information is one of the surest means of protection; if the enemy's dispositions are known and his movements carefully watched, he will have little opportunity of effecting surprise. Every commander in his degree therefore makes arrangements for protection by *information;* the means which he employs may vary from the despatch of air reconnaissances and of mobile forces by the the commander of a large formation down to the look-out man sent ahead by a patrol or the sentry posted by a section. But since information can never be entirely complete nor up-to-date (Sec. **31**), protective detachments, which will protect by *resistance*, while the main body is getting ready for action,

are also always required, although good information will enable the numbers employed for protective resistance to be economized.

A force despatched on a special reconnoitring mission (whether it be a mobile force of all arms sent forward by an army or a patrol sent out by a platoon) cannot be relied on for protective duties also. (Sec. **33**, 2.)

3. The general system of protection against ground attack is the same in principle, whatever the circumstances; the commander of the body to be protected throws out detached forces of mounted or dismounted troops, or of all arms, in every direction from which attack is possible; these detached forces in turn provide for their own safety by pushing out smaller protective detachments, and so on. A protective detachment has two duties: firstly, observation and reconnaissance by means of patrols and observation posts within the limits for which it is responsible; and secondly, resistance sufficient at least to give the superior commander time to prepare for action. The actions of a protective detachment must be regulated solely in the interests of the main body.

4. A commander is named for the larger protective detachments (Sec. **14**, 4), and will normally be the commander of the unit or formation providing the bulk of the detachment. The commander who makes the detachment is responsible that it has an adequate staff and means of intercommunication.

5. A force given a protective role must continue to carry out that role until relieved or given other orders. Thus at the end of a march the troops which have covered the march remain responsible for the protection of the main body when it halts, until other arrangements are made by the commander of the force. Similarly, when the march recommences, outposts will not be withdrawn until the troops detailed for the protection of the march are in position.

6. Protection against ground attack may be considered under the headings of protection when on the move and protection while at rest. Detachments for protection on the move are usually referred to as advanced, flank or rear guards, and detachments for protection while at rest as outposts. No general rules for the strength and composition of protective detachments can be laid down, except that, like all other detachments, they should be no larger than is

necessary for the proper performance of their task. Some guidance towards determining their composition will be found in later sections in this chapter.

7. In all forms of protection there is always a danger of over-confidence producing carelessness. The same rather fatiguing precautions are taken day after day, and nothing is seen of the enemy; vigilance is then apt to be relaxed, probably with disastrous results. Savage or irregular enemies in particular are quick to note and take advantage of the least omission or carelessness. It is the duty of all commanders to insist at all times and in all circumstances on the strict observance of the service of protection. This depends in the end on the discipline maintained and on the example set by regimental officers.

8. When protective detachments become engaged with the enemy, they act in accordance with the ordinary principles of attack and defence. Since they are normally responsible for a wide front in proportion to their strength and since they have usually to fight for a limited time only without support, their dispositions are not usually made in the same depth as is required for a decisive attack or for protracted defence.

9. The special methods of protection necessary in mountain warfare and in various forms of savage warfare are dealt with in Chapter X.

38. Protection against air reconnaissance and attack

1. Protection against the air comprises *concealment* of dispositions and moves from air reconnaissance, and *defence* against bombing, gas-spraying or low-flying attack by aircraft. Concealment may be effected by the use of cover or other means to prevent observation, such as camouflage and the adoption of inconspicuous formations. Anti-aircraft artillery, when available, will assist by making the task of the reconnoitring aircraft difficult and dangerous. It may be possible by a concentration of our own aircraft to obtain local air superiority for a limited period and over a limited area during some particular operation; any attempt to use fighter aircraft for prolonged periods in a defensive role will be uneconomical and usually ineffective. A vigorous counter-offensive normally provides the most effective answer to air attack.

Ground defence against air attack comprises the distribution of troops and of stores in such a way or so protected by natural or artificial cover as to offer the least possible target to air attack, as well as active measures of protection by anti-aircraft artillery and small-arms fire. The special measures of defence against gas attack from the air are dealt with in Sec. **40.**

2. Measures for concealment have to aim at defeating both visual observation and photography. By the use of powerful lenses photography at 20,000 feet can give in favourable conditions as much detail as observation from a low altitude. Generally speaking, photography is harder to evade and deceive than visual observation; any measures that will defeat the camera will usually defeat the observer.

The position of troops may be given away to an air observer by the use of regular formations, by movement, dust, smoke from cookers, the exhaust of mechanical vehicles, reflected light from smooth surfaces. When under observation which it is important to avoid, troops should halt, in shadows if possible, refrain from looking upward, stop the engines of mechanical vehicles to prevent exhaust smoke, try to conceal the smoke of cookers and cover up all polished surfaces. If troops are in the open, they can hamper the observer by adopting irregular formations, and, if on a road with hedges or trees, by opening out on either side of the road.

Shadows provide an effective form of concealment, and the shadows cast by buildings, cuttings, embankments, walls, hedges, trees, etc., may be used. The value of woods to give cover to troops cannot be decided from a map; it varies considerably according to the nature of the trees and the time of year; more can be seen by an observer vertically above a wood than would be supposed from the ground.

Field defences are easily seen from the air unless carefully sited and executed and it will frequently be advisable, where concealment is of great importance, to use natural cover, such as banks, hedges and buildings, even though some advantage of siting may be sacrificed, rather than prepare new works in the open. It is often as important to conceal a work from the air during construction as after completion. The concealment of machine-gun emplacements is always of especial importance. Camouflage and other measures of deception (e.g. dummy trenches) require time and skill if they are to deceive experts in the interpretation of air photographs, but will be used whenever time and

material are available (Manual of Field Engineering, Vol. I (All Arms), 1933, Chapter VI).

Tracks are especially visible from the air, and should therefore be continued past the position to which they lead; foot and wheeled traffic should follow routes which will disclose as little information as possible. Air photographs of our own positions may be taken to show how far concealment has been effective, or of woods to show what cover they offer.

Weather forecasts may be of importance when it is desired to conceal a movement from the air; a ground mist is the most effective cloak, and low clouds make air reconnaissance more difficult and dangerous.

3. Anti-aircraft artillery at the base and on the lines of communication is employed to defend important depots, railway centres, ports, etc., which are likely to be the targets of hostile air attack. In the forward area it protects the main concentrations of troops; covers the passage of vulnerable points, such as bridges and defiles or open stretches of road; and limits or hampers hostile air reconnaissance. It will also protect its own close reconnaissance and artillery observation aeroplanes as far as possible. The anti-aircraft machine-gun batteries, which are used for the protection against low-flying attack of important and vulnerable points, such as bridges or defiles, come under the air defence formations.

Anti-aircraft artillery units are not distributed to formations, but are allotted and sited on an area basis. Guns are normally sited by sections in positions about 4,500 yards apart; this enables a battery to cover a circular area with a radius of about 4½ miles to a height of 18,000 feet. A battery protecting a march can cover about 12 miles of road at a time to a height of 18,000 feet or 17 miles of road to a height of 12,000 feet. When protecting moving columns, anti-aircraft artillery will frequently have to pass up the column to take up a new position. If suitable side roads exist, they should be used, provided that they are not unduly exposed to hostile attacks, particularly by armoured cars. If only one road is available, anti-aircraft artillery will take advantage, if the road is narrow, of the hourly ten minutes' halt, during which guns can cover about three miles. Priority should always be given by other troops to anti-aircraft guns moving to take up positions.

At the base and in rear areas, anti-aircraft guns, will have the assistance of searchlight units to combat air attack at night. But in mobile warfare, searchlights will seldom be available in the forward areas, and anti-aircraft guns will therefore be unable to afford protection by night.

4. Rifle fire is effective against aircraft up to 2,000 feet, the fire of suitably mounted machine guns and light machine guns up to 3,000 feet. Aircraft carrying out low-bombing attacks, low-flying attacks by machine gun fire or reconnaissance below 3,000 feet can therefore be effectively dealt with by small-arms fire. It is the duty of every commander of troops armed with small arms to make arrangements to use these weapons against the above forms of air attack. When troops are on the move, rifle fire will generally be quicker to produce and therefore more suitable, but light machine guns should also be brought into action if time permits. Rifle fire to be effective must be controlled, and as many rifles as possible should be employed, so as to produce a sufficient volume of fire. It may sometimes be advisable, when troops are on the move and it is important that the movement should not be checked by low-flying attacks, to provide continuous protection on certain portions of the route by piqueting it with light machine-gun detachments. When troops are halted, light machine guns will be put into action; when time permits, a system of area defence will be organized, light machine guns being sited chequerwise from 500 to 800 yards apart, so as to cover the whole area.

The first essential is timely warning of the approach of hostile aircraft; air sentries must therefore always be detailed when air attack is possible. They should be frequently relieved, since to watch for aircraft involves considerable strain on the eyes. When an attack takes place, the opportunity for fire is fleeting and rapidity of action essential; the initiative for opening and controlling fire must therefore be delegated to subordinate commanders, and the troops must be instructed beforehand on their action. When troops are concealed, definite orders must be issued whether light machine guns are to be posted and fire opened against hostile aircraft or not; the opening of fire may give away to a hostile air observer the fact that the area is occupied, which he would not otherwise have detected.

It must be explained to troops that, although small-arms fire may not often bring an aeroplane to earth and may appear ineffective, actually the damage caused to frame, rigging and fabric by well-directed fire is very considerable

and may put aircraft out of action for considerable periods. The moral effect on pilots is also appreciable. Further instructions on small-arms fire against aircraft will be found in Small Arms Training, Volume II.

39. Protection against armoured fighting vehicles

1. The means by which troops will seek to protect themselves, while on the move or at rest, against the menace of attack by armoured fighting vehicles may be active or passive or a combination of both. The active means of defence specially designed for this purpose are anti-tank weapons or small mines; certain types of artillery (field gun and anti-aircraft gun), though not, except in special circumstances, sited primarily for use against armoured fighting vehicles, have always a secondary role of anti-tank defence; while counter-attack by our own tanks, when available, may be the most effective means of all. A tank counter-attack should, whenever possible, be incorporated in any plan of defence against tanks. Fire by rifles, light machine guns and machine guns, though not usually effective against the armour of tanks and armoured cars, will force them to close down their turrets and will hamper their observation. Grenades may sometimes be effective against armoured cars. Passive means of defence include the use of natural obstacles (such as woods, streams, marshy ground), of the protection afforded by buildings (or, by blockhouses specially constructed where time is available), and the construction of road blocks or artificial obstacles of various types.

2. The anti-tank weapons may either be shoulder controlled rifles firing large calibre armour-piercing bullets or light guns with explosive projectiles. For the protection of vulnerable points on the lines of communication or at the base, or of aerodromes, guns on fixed mountings may be used.

Anti-tank mines are fired by contact when a vehicle passes over them. Those used in the forward area are rendered active by inserting detonators; they can be easily raised and laid; when laid they are unsafe for the passage of vehicles, cyclists or marching troops. On the lines of communication, or in a protracted defence, mines of a different type may be used, which are buried and wired; they are safe until rendered active by means of an electric current. All mines laid must be notified to the general staff, who will be responsible

for the precautions necessary for the safety of our own troops and for the measures necessary to prevent our own vehicles being damaged.

Generally speaking, mines or other obstacles should, when practicable, be used to block defiles, and so to economize anti-tank weapons, which will be required to cover open ground over which tanks are likely to attack. Minefields, like other obstacles, should be covered by fire to prevent their removal, machine guns or light machine guns being suitable. It is important that mines and tank obstacles should always be concealed. A dummy minefield can be rapidly made and is sometimes of value. Surprise should always be aimed at in measures of anti-tank defence.

3. Commanders must always co-ordinate the system of anti-tank defence within their areas, so that all available means of defence—weapons, mines and obstacles, both natural and artificial—may be used as effectively and economically as possible. Only by these means can full use be made of the measures available, which will often be very limited. The pooling of anti-tank resources must not, however, be allowed to expose any unit or formation without means of anti-tank defence to the possibility of attack by armoured fighting vehicles.

4. The radius and striking power of armoured fighting vehicles, and the greater radius of action conferred on other troops by the use of mechanical transport in a well-roaded country, will, when the enemy disposes of such troops, raise special problems of protection, particularly affecting a force on the move.

Advanced and rear guards should be given a sufficient allotment of anti-tank weapons to make them capable of dealing with an attack of this nature; where there is a definite threat of action against a flank by enemy armoured fighting vehicles, a flank guard of suitable composition must be detailed to meet it.

There will, however, be many occasions when, though no immediate threat against a flank exists, actions by small numbers of armoured fighting vehicles or troops in mechanical transport may be expected. In such a situation the most economical form of protection may be to establish piquets covering the approaches on the threatened flank or flanks. These piquets prevent the column being fired into at short range and give warning of any attempt to break into the

line of march. They should make the fullest use of obstacles, the protection of buildings, and anti-tank mines, to economize the limited number of anti-tank weapons available, the mobility of which should be exploited to meet the attack where it actually develops. Piquets will normally be put into position by the advanced guard and withdrawn by the rearguard, in much the same way as piquets in mountain warfare (*see* Chapter X). It is sometimes possible to select on the flanks of the line of advance certain road centres or passages over obstacles, the blocking of which will greatly restrict the enemy's movements and enable piquets to be economized. This form of piqueting cannot be expected to hold off a serious attack, though it should give warning and cause delay. The main column must therefore be prepared to assist the piquets, more particularly with gun fire, and with this object it may be desirable to make a special distribution of artillery in the order of march. Air reconnaissance, to notify the approach of enemy mobile troops, and some pre-arranged signals by aircraft to indicate the position of the armoured fighting vehicles and the direction in which they are moving, are also important.

The protection of rearward areas (i.e. divisional, corps, etc.) against enemy mobile troops may require special measures. Headquarters, administrative units and installations should, where possible, keep in the neighbourhood of reserves of fighting troops and, when halted, make the fullest use of ground and buildings to provide defence against enemy raids. It may be necessary to detail detachments of fighting troops for the protection of divisional and corps areas; such detachments will normally consist of infantry with their proportion of anti-tank weapons and possibly of engineers.

5. If stationary tanks are located, they may often be effectively bombed by aircraft; and tanks at rest, unprotected by other troops, may sometimes be attacked with success by infantry or dismounted cavalry, especially at night.

40. Protection against gas

1. An outline of the potentialities of gas as a weapon and of the probable methods which an enemy may employ to make use of them has been given in Sec. **10**. Further details of these probable methods will be found in the chapter dealing with position warfare (Chapter IX).

2. Effective defence against gas depends firstly on efficient equipment and stores, which can only be produced as a result of constant and careful research; secondly, on the training and discipline of all ranks (*individual protection*); and thirdly, on good organization by commanders of all precautionary measures and means available to protect groups of men, animals, equipment, stores, and food (*collective protection*).

Details of the equipment and stores used in combating gas (anti-gas respirator, goggles, cape, protective clothing, bleaching powder, etc.) will be found in the Manual of Defence against Gas.

3. A high standard of individual training is essential to ensure that equipment is used correctly and in time; good gas discipline, based on confidence in the equipment and skill in its use, is essential if casualties are to be prevented and the danger of panic lessened. All ranks should know the types and characteristics of war gases and should be able to recognize them; and should be able to carry out normal work while wearing a respirator for a period of two consecutive hours.

4. The first essential in collective protection is a good system of alarm signals to warn troops that gas is being used by the enemy. Gas alarms are of the following types:—

i. *Sound alarms* will be given on a special type of rattle in the forward troops (i.e. companies of infantry and equivalent units) as a warning against any type of gas attack; this local alarm will be supplemented in the event of a gas cloud attack by a special code sounded on sirens, which will be held at the headquarters of infantry battalions and equivalent units and at headquarters further in rear; warning of a gas cloud will also be distributed by telephone, wireless, etc. The siren code for a gas cloud attack will not be used as a warning of other forms of gas attack owing to the risk of unnecessarily alarming troops outside the affected zone.

ii. *Detectors, spray,* consist of detector discs (luminous at night) placed on the ground or on the tops of vehicles, to indicate the arrival of gas spray in billeting and bivouac areas and on the march.

iii. *Detectors, ground,* to detect liquid blister gas in contaminated areas.

iv. *Warning signs,* to mark those areas. (*See* Manual of Defence against Gas.)

The efficiency of the above forms of alarms will depend on the provision of sentries to work them and on the knowledge and alertness of those sentries ; a sentry will be posted with each sound alarm and with each group of detector discs. Wherever possible, to economize personnel, the duties of gas sentries should be performed by those posted for tactical protection. The action to be taken on the alarm of gas being given either by sound or by detector discs must be laid down in standing orders and thoroughly understood by all ranks.

5. The following measures of protection will minimize the risk of casualties from gas attack :—

i. Personnel who are exposed to the risk of gas attack will wear their respirators so that they can be adjusted instantly on the first indication of gas attack ; delay may be fatal.

ii. Precautions must not be relaxed after a gas attack of any nature, as the attack may be repeated at once in the same or in a different form.

iii. Protection against air spray attack on the march and in the open will be provided by protective equipment (goggles and cape), and by utilizing, whenever the tactical situation permits, the cover of walls, banks, hedges, etc. Troops at rest or in reserve, when there is a danger of air spray attack, will be kept, as far as possible, under cover in billets or camps, or will bivouac in thick woods, which give a measure of protection.

iv. Areas heavily contaminated by blister gas should be cleared of troops as far as the tactical situation permits ; if casualties are to be reduced, arrangements will be necessary to supply clean clothing and equipment to troops who have been exposed to air spray attack or have passed through a contaminated area.

v. Since air spray or other gas attacks may be made at night, troops should sleep under cover as far as possible ; if troops bivouac in the open and air spray is likely, the gas-proof capes will be used as a top covering ; sentries should be so posted that troops can be awakened in time to allow the adjustment of their respirators.

vi. Animals should, as far as possible, be kept under cover in stables or in the shelter of trees ; measures must be taken to prevent them grazing on ground contaminated by blister gas.

vii. Supplies of food and water for men and animals can be contaminated by gas and may cause casualties if consumed ; they should, whenever practicable, be protected by tarpaulin or other covers ; supplies which have become contaminated should be destroyed. Food in sealed metal containers is unlikely to be contaminated and may be eaten, unless there are signs of gas when the container is opened. Water from areas contaminated by blister gas must not be used for drinking or for ablution ; boiling does not necessarily purify water so contaminated.

viii. During a gas attack, weapons, ammunition and instruments should be kept covered when not in use.

6. All ranks must know the methods of using the equipment provided to decontaminate weapons, instruments, vehicles, etc., and of sealing or removing blister gas from an area where frequent passage is necessary, e.g. a headquarters or dressing station. Contaminated clothing and equipment will be collected and removed under special arrangements, since its cleaning is a technical process involving a considerable plant.

7. Since the lines of communication (including base areas) are liable to gas attack by aircraft, the measures of protection outlined in the preceding paragraphs will be applied also to those areas. More elaborate methods of defence, such as those used in position warfare, will be possible. (*See* Chapter IX and Appendix X.)

Protection when Advancing

41. Advanced guards—general

1. Every body of troops advancing towards the enemy will be covered by an advanced guard, which is charged with the duties of gaining information of the enemy, of preventing the enemy reconnoitring troops from gaining information, and of engaging the enemy when encountered so as to brush aside minor resistance without delay and to give the main

body time to deploy for action when the enemy is met in force. Since it has to reconnoitre, which takes time and entails movement at a considerable distance from the line of march, an advanced guard will require the most mobile troops available (e.g. cavalry for an infantry column, armoured cars or light tanks for a mechanized column); and since it has to fight, it will require a due proportion of the fighting troops (mounted or dismounted) of which the main column is composed and of the supporting artillery and engineers. Its actual composition and strength cannot be made subject to rules; it will vary according to circumstances. It is desirable that, for convenience of command and administration, it should when possible, comprise a complete sub-unit, unit or formation. Owing to the small number of tanks normally available, they are not usually placed with an advanced guard unless the whole column is mechanized, or there is a likelihood of hostile armoured fighting vehicles being met, or some special reason exists for wishing to deal rapidly with the hostile covering forces.

It is desirable that the advanced guard should be strong in artillery (Sec. **43**, 2). The nature of the ground will often make it desirable that a portion of the field artillery allotted to an advanced guard should be howitzers, since they can get into action almost anywhere without delay. Owing to its long range and shell power, medium artillery is often of great value with an advanced guard, if an artillery reconnaissance aeroplane is available.

A proportion of engineers will usually be allotted to the advanced guard, to clear away obstructions, to improve communications or to bridge obstacles. Whether or not engineers are allotted to the advanced guard, an engineer reconnaissance party will, whenever engineers form part of the main column, accompany the advanced guard; it should usually work well forward, with the advanced guard mobile troops or with the vanguard.

A field ambulance, or a portion of it, will be allotted to an advanced guard, if likely to be required.

2. An advanced guard is disposed and acts on the general principles stated in Sec. **37**, 3. Its main body is called the main guard; from it is pushed forward a protective detachment called the vanguard, which in turn throws forward an advanced point and any other protective patrols necessary. Beyond the vanguard again are the mobile troops allotted to the advanced guard, whose action is considered in Sec. **42**.

3. When a force is advancing in more than one column, it will be usual for each column to detail its own advanced guard, but there may be occasions, in open country, when the commander of the whole force may find it more convenient to detail a single advanced guard to cover the whole front of the force. When there are separate advanced guards, the mobile troops will usually be divided between the advanced guards of the various columns. The advanced guards will maintain touch (usually by means of liaison personnel or wireless), and the commander of the whole force may regulate the movement by laying down the hour at which leading units or formations will pass a starting line, and by prescribing that columns shall establish communication on certain lines.

4. An advanced guard commander, who will be named in operation orders (Sec. **14**, 4), will be given all available information, both of the enemy and of the movements and objectives of our own troops, so far as they affect the performance of his task. He must be fully acquainted with the intentions of the commander of the force which he is to cover, and may, if necessary, be given some indication of the distance ahead of the main body at which he is to move (Sec. **43**, 1).

The headquarters of an advanced guard commander will usually be at the head of the main guard, but he himself may often be further forward to observe the situation and to get early information. If a close reconnaissance aeroplane is working on the front on which the column is advancing, arrangements should be made by which the advanced guard commander will be enabled to receive at once the information sent in by the aeroplane. Oblique air photographs of important features on the line of advance will often be of great value to an advanced guard commander. The order for such photographs must be sent in good time, since it will require some hours for the results to reach the advanced guard commander.

5. The task of an advanced guard commander is an important and difficult one. He must act quickly and boldly if he is to prevent the main body being continually delayed by minor opposition; but he must be careful not to hamper the plans of his superior commander by action which may cause the force to become committed to a general engagement in conditions or on ground unfavourable to the superior

commander's intentions, of which he must always be fully informed. Action against the enemy's flanks will usually be the quickest and most effective way of dealing with minor opposition; while a wide deployment is usually required when more serious resistance is encountered (Sec. **43**, 3). An advanced guard should therefore move on a broad front when possible, and must be prepared to deploy rapidly when the enemy is met. Similar considerations apply to the task of the commander of the advanced guard mobile troops. (Sec. **42**).

42. Advanced guard mobile troops

1. When an army is advancing, the commander will usually send ahead a mobile force with the object of reconnaissance or with some other special mission (*see* Field Service Regulations, Volume III, 1935, Chapter III). The action of this force will afford to the main columns information and a degree of protection which will vary according to the nature of its mission; but since it may be operating at a considerable distance from the main body, it cannot be relied on for local protection. A cavalry regiment, the main duties of which are reconnaissance and protection, is therefore a permanent part of a division.

2. The commander of a marching force with mobile troops at his disposal, such as the divisional cavalry regiment, may use a portion of them for some special reconnaissance or other mission to the front or flanks. Such portion as he intends to employ for the protection of his column or columns he will normally allot to his advanced guard commander, or, if advancing in more than one column, to the commanders. Such portions of the divisional cavalry regiment or other mobile troops as are placed under the orders of an advanced guard commander are called advanced guard mobile troops. An advanced guard commander will usually keep these mobile troops under his own orders, but may, if the advanced guard is a large one, sometimes sub-allot a proportion to the vanguard commander.

3. The advanced guard mobile troops will usually be employed to cover the advance of the column by reconnoitring and giving early warning of the presence of the enemy, by driving away minor opposition and by checking any advance on the part of the enemy. When they encounter opposition which they cannot overcome, they will

endeavour to ascertain the strength of the enemy and the extent of front which he holds, preparatory to support by the remainder of the advanced guard. (Sec. **43**, 2.)

The advanced guard mobile troops may also on occasions be used to seize and hold important tactical features until the arrival of the slower moving troops of the advanced guard; or for some special reconnaissance or other mission, though this latter task will more usually be performed under the orders of the commander of the force (*see* para. 2, above). Any mobile troops used for either of these tasks cannot be held also responsible for the protection of the column, except in so far as the nature of the task itself affords protection.

The commander of the advanced guard mobile troops must be given a clear picture of what is known and of what is expected; of what the intentions of the advanced guard commander are; and of what the successive objectives of the advanced guard are. (Sec. **43**, 1.) He must be told what is expected of his mobile troops; with what flank formations, if with any, he is to keep touch and where; what is to be his action if the enemy is met; and, if necessary, by what time reports on particular subjects are required.

4. The advanced guard mobile troops, in covering the advance, normally move from one tactical feature to the next by "bounds"; that is to say, having gained one feature (e.g. a line of high ground, a wood, a village, a water obstacle) they halt and push forward patrols to report the next feature clear or otherwise; if it is reported clear, they move rapidly to it and again push patrols forward towards the next feature. Cavalry moving in this way can usually maintain an average pace of three to four miles an hour, i.e. sufficient to keep ahead of an infantry column and afford it protection; light tanks covering a mechanized column may be expected to maintain an average of about ten miles an hour. The leading cavalry patrols should, in open country, be about four to five miles ahead of the nearest infantry; light tanks should be about the same distance ahead of the leading vehicles of the column which they are covering.

43. Action of an advanced guard

1. An advanced guard must be in a position to protect the main body by the time the latter begins its march;

this will usually mean that the advanced guard must pass through the outpost line before that hour.

The commander of the force may, if necessary, give to the advanced guard commander a general indication of the distance at which the advanced guard is to precede the main body. This distance will depend on the size of the force, the features of the ground, the tactical situation and the intentions of the commander of the force. In the face of modern weapons, to overcome even slight opposition will take time, and, if the main body follows too closely behind its advanced guard, its march may continually be checked by minor delays, and its power of manœuvre will be restricted. On the other hand, if there is too great a gap between the advanced guard and the main body, there is a danger that the enemy may be able to interpose between the advanced guard and the main body. If a defile has to be passed, the advanced guard should, if possible, be far enough ahead to secure an unmolested exit for the main body before the latter enters the defile.

The advanced guard commander will decide, from the map in the first instance, on the successive tactical features which are of importance, in order to protect the march, and will make his dispositions accordingly. The times at which an advanced guard halts are regulated by the tactical situation and by the features of the ground, and do not necessarily synchronize with the hourly halts of the main body.

2. If the advanced guard mobile troops encounter opposition which they are unable to overcome, they will be supported by the vanguard, which may be able to deal with the hostile resistance without the help of the main guard. Once contact with the enemy has been gained, it is advisable that some of the supporting artillery should always be in action, whilst the remainder moves forward to new positions; a rapid concentration of artillery fire will often enable minor opposition to be quickly overcome, without the need to deploy additional troops.

3. When it becomes obvious that strong enemy forces have been encountered, the advanced guard commander will be guided by his instructions and his knowledge of the intentions of the force commander; since the latter will require both information on which to base his plan and time and space to put it into execution, bold and vigorous action by the advanced guard is usually essential. Deployment on a wide front, with a view to locating the enemy's flanks, is justified; and endeavour will be made to secure such tactical features as will best further the action of the main body (e.g. good observation posts, ground covering the passage of defiles, anti-tank obstacles).

As the advanced guard action develops, its commander will receive orders from the commander of the force as to the part it is to play in the forthcoming battle. It may be required to hold the enemy on its front, while the main body attacks from a flank; or to cover the occupation of a position by the main body; or to act in any other way that the situation requires. When the main body begins to deploy on its battle frontage, its leading troops must provide for their own protection, if not covered by the dispositions of the advanced guard. Once the main body is deployed, the advanced guard will form part of the battle front and its special role as a protective force will end.

44. Action of an advanced guard following up a withdrawal

1. When two forces are in close contact during battle, the forward troops are responsible for their own protection. If the enemy withdraws, the forward troops will be responsible for maintaining contact during the initial stages of the advance, and special advanced guards will not be formed until it is clear that the enemy has shaken himself clear and is moving back a considerable distance.

2. Advanced guards following up a withdrawal should be relatively strong, with a large proportion of mobile troops (unless the mobile troops have been sent to intercept the enemy) and of artillery. They should act with boldness and should endeavour to drive in the enemy rear guards and to reach positions from which they can attack his main columns and prevent an orderly withdrawal. As the enemy will be likely to cover his withdrawal by demolitions and other expedients (Sec. **49**), the advanced guards should be strong in engineers.

3. Should the enemy be using gas, he may endeavour to delay the advance by contaminating with blister gas areas over which the advance must pass, such as defiles or cross-roads. In a deliberate withdrawal, considerable areas may be thus contaminated by the enemy. A passage over such

areas may be provided by laying down gas-proof capes, or by using any other available material such as assault bridging equipment, earth, corrugated iron, wood. Men engaged in making a passage must wear protective equipment, which the engineers with the advanced guard should have with them; the protective equipment carried by other engineer units should also be readily available if there is a likelihood of other troops being required to assist the engineers. Billets, before occupation, should be carefully examined for contamination by blister gas, and troops should be warned of the danger of " booby traps " (gas or explosive).

If the enemy is hard pressed, he may use low-flying spray attack by aircraft against the pursuing troops; the danger of this threat can be lessened by moving on a broad front, by good anti-aircraft measures and by the use, when halted, of the cover provided by woods and buildings.

45. Rear guard to a force advancing

1. An advancing force will detail a small protective detachment to cover the rear of the column. If there is little danger of attack from the rear, its principal duty will be to collect stragglers, and it should have with it a detachment of the provost corps and a portion of a field ambulance. Where there is any danger of attack by armoured cars or mobile troops, the rear guard should include mobile troops for reconnaissance and anti-tank weapons.

2. If the main body and the transport march without any considerable distance between them, the rear guard will follow the transport and will protect the rear of the whole column; if there is a long distance between them, the rear guard will follow the main body and separate arrangements will be made for the protection of the transport.

Flank Protection

46. Flank guards

1. If there is a possibility of a column being attacked from the flank, a flank guard will be detailed by the commander of the force. If both flanks are vulnerable, two separate flank guards may be necessary. Flank guards are known as *right flank guard* or *left flank guard* according to the flank of the column which they protect. A commander for a flank guard will be appointed by name. (Sec. **14,** 4.)

The role of a flank guard is to prevent the enemy from interfering with the march of the main body; this will usually mean that it must endeavour to deny to the enemy ground observation of the route along which the main body is moving.

2. A flank guard, like an advanced guard, has to reconnoitre and to fight in order to protect the main body, and its strength and composition are therefore governed by similar considerations (Sec. **41,** 1). There are, however, certain differences in the functions of a flank guard. Whereas the role of an advanced guard is usually offensive (Sec. **43,** 3), that of a flank guard is defensive. Since a flank guard has to work on a wide front to cover the whole length of the column which it is protecting, mobility is of special value to it, and it should, whenever possible, be strong in mobile troops.

It is most important that a flank guard should keep close touch with the main body, on the progress of which its position and action depend. It should be provided with wireless sets and with liaison personnel for this purpose. If a close reconnaissance aeroplane is working over the area through which the column is marching, arrangements should be made that the flank guard commander may receive, with as little delay as possible, the information obtained by the aeroplane.

3. A flank guard throws out smaller detachments for its own protection, as described in Sec. **37,** 3, and thus may have its own advanced guard, flank guard and rear guard. Since a flank guard has such a wide front to cover, early warning of the enemy's approach is essential, and the mobile troops of the flank guard should be pushed as far out to the flank as the mobile troops of the advanced guard are to the front (Sec. **42,** 4), i.e. up to four or five miles in open country.

4. A flank guard may be moving or stationary. With small forces, it may move parallel to the force which it is protecting, by road if suitable routes exist or across country if the ground is unenclosed. With larger forces, it can usually best perform its role by occupying some commanding feature on the flank or by holding the crossings of some natural obstacle, such as a river, until the main body has passed. It may occupy a succession of such features, by a process of gradual side-slipping as the column it is protecting advances. If a flank guard is delayed or becomes engaged with the enemy, it may, unless composed of mobile troops,

be unable to regain its original position relative to the main body. It may then be necessary for the commander of the main body to detail a fresh flank guard, while the original one joins the rear guard when the main body has passed. A careful calculation of time and space is an essential element in all flank guard operations.

Should a commander anticipate the possibility of a dangerous attack from a flank during a march, as for instance when making a march across the enemy's front, he should so arrange the order of march of the main body as to facilitate rapid deployment to a flank in support of the flank guard. He should give the flank guard commander clear instructions as to his action if attacked and what support he may expect from the main body.

5. A savage or irregular enemy will seek to gain success by exploiting his mobility to concentrate against weak points, such as the flanks of a long column. Special measures of protection for the flanks in bush, desert and mountain warfare are dealt with in Chapter X.

Protection when Retiring

47. Rear guards—general

1. The conditions in which a force may withdraw in the face of the enemy are dealt with in Field Service Regulations, Volume III, 1935, Chapter VII.

A force retiring covers itself against enemy pursuit by a rear guard. The duty of the rear guard is to secure for the main body an unmolested withdrawal and the time to put into execution any plans of which the withdrawal is a part. Since it will usually have to hold off the pressure of an enemy advancing in superior strength, a rear guard is a fighting force of all arms. It should be strong in mobile troops, which can reconnoitre, can protect the flanks against wide turning movements and can hold a position till the enemy is close, using their mobility to retire in safety; and in artillery, the long-range fire of which will compel the enemy to deploy early and will thus gain time. The infantry allotted to a rear guard should be strong in machine guns, since long-range fire power rather than numbers of men are required; it will facilitate the task of the rear guard if the infantry, or a part of it, can be given additional mobility by the use of mechanical transport. Tanks, if available, are of great value to a rear guard, since their power to strike a swift blow at the enemy

advanced troops and then to withdraw rapidly will impose slowness and caution on the pursuit. They can also counter-attack the enemy tanks, which may be used well forward. Good information is essential for the successful conduct of a rear guard, and aircraft, if available, will be detailed to work directly under the rear guard commander. The engineers of the force will usually be engaged on the preparation of demolitions or other expedients to delay the enemy (Sec. **49**, 2), but a small proportion should form part of the rear guard, for unforeseen demolition tasks or other engineer work.

The strength of a rear guard must depend on the circumstances, e.g. the closeness of the pursuit and the suitability of the ground for delaying action. If the withdrawal is the result of an action, the freshest troops available should be selected for the rear guard.

Troops forming a rear guard will be accompanied only by such transport as is essential for fighting purposes.

2. A rear guard is divided into rear guard mobile troops, rear party and main guard, corresponding with the mobile troops, vanguard and main guard of an advanced guard (Sec. **41**, 2); and its disposition on the line of march, when not pressed by the enemy, resembles that of an advanced guard turned about.

3. The rear guard commander is appointed by the commander of the force to be protected. If a force is retiring in more than one column, separate rear guards may be formed for each column; if so, the commander of the force must co-ordinate the withdrawal of all the rear guards by laying down times up to which certain lines must be denied to the enemy.

A rear guard commander should be told the probable rate of movement of the main body, the approximate distance to be maintained between the rear guard and the main body, what demolitions are being put in hand to delay the enemy's advance and to what extent he is at liberty to carry out demolitions with his own resources. He should be kept informed periodically of the progress of the main body, and must himself keep the force commander constantly informed of the tactical situation; liaison personnel are valuable for this.

48. Action of a rear guard

1. The task of a rear guard is to keep the enemy at a distance from the main body and at the same time to be

able to withdraw without becoming seriously involved, i.e. to compel the enemy to move as slowly as possible. The first requirement, as in any other operation of war, is good information, from air reports and reconnaissance by the mobile troops; the second requirement is the development of fire at long ranges by artillery and machine guns to compel the enemy to deploy early; the third requirement is mobility, to facilitate a rapid withdrawal. A rear guard usually carries out its mission by taking up a succession of defensive positions, which the enemy is compelled to make dispositions for attacking or turning. Before the attack can fully develop, the rear guard withdraws, to repeat the same manœuvre on the next favourable ground.

2. In selecting and occupying rear guard positions, it is important, firstly, to show as strong a front as possible and secondly, to make sure of good lines of retreat (*see* para. 5. below). A rear guard position does not require such depth as a position which is to be resolutely defended; the greater part of the force may be deployed in the forward line from the outset, leaving only a proportionately small part in reserve. Mobile troops will be used to protect the flanks and to carry out reconnaissance beyond the flanks. Artillery positions will be selected with a view to long-range fire and also to ease of withdrawal.

3. The commander of the force to be protected may either order the withdrawal of the rear guard to be carried out on a timed programme, i.e. lay down definite times up to which successive positions must be denied to the enemy; or he may give the rear guard commander latitude as to his time of withdrawal, provided that the duty of protecting the main body is assured. A timed programme will usually be necessary, if pressure by the enemy is close. When a timed programme is laid down, the times are based on the anticipated rate of movement of the main body and on the nature of the ground, since the enemy must not be permitted to occupy positions from which he can effectively shell the main body in column of route: any factors which may alter the timing, e.g. a quicker or a slower rate of progress by the main body, should be at once communicated to the rear guard commander.

In a timed programme, the rear guard may, in order to maintain its positions to a fixed hour, have to undertake close fighting or to deliver a counter-attack. When a rear guard becomes closely engaged late in the day and its lines of withdrawal are under enemy observation, it may prove advisable to maintain the position, until the approach of dusk prevents or hampers enemy observation and facilitates concealment of the withdrawal.

4. Successive main positions should be far enough apart to force the enemy, after deploying for attack on one, to move his artillery before attacking the next; this will usually mean with forces of all arms that they should not be less than about two miles apart. Whenever possible, a part of the rear guard should be sent back in time to occupy the next main position in rear before the withdrawal from the previous one is complete; this will enable a well-organized defence to be established in good time on the new position, under cover of which the remaining troops can reform on withdrawal. This may not always be possible when the rear guard is responsible for a wide front; but officers will in any event always be sent to reconnoitre the lines of withdrawal and the next position in rear.

It is always desirable that, once rear guard troops have disengaged from the enemy and left a position, they should be able to go straight back through a position already held. It may, therefore, be necessary, when the rear guard is being closely pressed, to occupy intermediate positions between the successive main positions; such intermediate positions are only intended to be held for a sufficiently long time to cover the retirement of the rearward troops, to allow them, if necessary, to reform and thus to maintain an orderly withdrawal.

5. The method of withdrawal of a rear guard engaged with the enemy is as follows. A part of the rear guard is, whenever possible, sent back to occupy the next main position in rear, to which reconnoitring parties should already have preceded it; while the remainder of the rear guard (including usually the whole of the mobile troops and artillery available) continue to hold the original position. These are then withdrawn gradually, until only small rear parties are left; the artillery retire by successive portions, so that support is afforded up to the latest possible moment. A portion of the rear guard will usually take up an intermediate position to cover the final withdrawal and to take advantage of the targets which will often be offered by the enemy as he arrives on the vacated position; but this intermediate position will

only be held long enough to give the last troops, whose retirement has often to be made at speed, time to collect and reorganize before continuing the withdrawal; fighting on an intermediate position should be avoided as far as possible.

The whole operation requires most careful control. The withdrawal of the rear parties along the whole front must be closely co-ordinated, in order that an intact front may be maintained to the last and the formation of gaps, through which the enemy may penetrate, be prevented. To effect this, the front for which the rear guard is responsible should be divided into sectors, the commander of each sector detailing his own rear party. The withdrawal of the rear parties will be co-ordinated by the rear guard commander, who will lay down the time at which the forward line of defended localities will be finally abandoned, or will indicate a line behind the forward line of defended localities which the various rear parties are to cross at a given time. The artillery will then know the situation and can apply fire accordingly. It is important that the enemy should remain in ignorance that a withdrawal is in progress for as long as possible; by day, lines of withdrawal should be selected to give cover from ground and air observation; and smoke may sometimes be used to cover the withdrawal or to draw the attention of the enemy elsewhere: by night, it is easier to deceive the enemy, provided that discipline is good and movements are made silently and without unnecessary lights. (Sec. **81**.)

6. It may sometimes be necessary for a rear guard to make a counter-attack, either to disengage a portion of the rear guard which has become seriously committed; or to re-establish the situation at a place where the enemy has broken through; or to take advantage of a favourable opportunity to strike a blow at a portion of the enemy's advanced troops and so to impose caution on him. The objective of such a counter-attack must be limited, and the attack should be supported by all artillery fire and other means available; if well planned and suddenly delivered, it will often have an easy success, which must not be pressed too far or the counter-attacking troops may be cut off. Tanks may be very effectively used for such a stroke. Skilfully laid ambushes may also, on occasions, be employed to impose caution on the enemy.

7. The rapidity of fire, accuracy and long range of modern

weapons, if skilfully used, makes it comparatively easy for a rear guard to impose delay on an advancing force and to keep it at a distance by the methods outlined above, so long as the pursuit is direct. The danger to a retreating force comes rather from flank attacks by mobile troops. If attack from the flank by mobile troops is probable, the main body may put out a flank guard or flank guards in addition to a rear guard. If so, close touch between the rear guard and the flank guard must be maintained; should a flank guard become engaged and be compelled to halt, it may be necessary for the rear guard to come to its assistance or to cover its withdrawal. The danger of air attack on a retiring force, especially by low-flying spray attack, must be counteracted by our own air force and by the methods of air and gas defence laid down in Secs. **38** and **40.**

8. The conduct of a rear guard action against a savage enemy is especially onerous, owing to the mobility of the enemy, his usually intimate knowledge of the ground, his partiality for attacking troops in retreat and the necessity for bringing in all wounded men. Withdrawal by well regulated stages is required, each stage covered by the fire of troops already in position. (*See* Chapter X.)

49. Expedients for delaying the advance of an enemy

1. The methods by which an enemy advance may be delayed and obstructed over a wide area by demolitions and other expedients, designed with a strategical object, are dealt with in Field Service Regulations, Volume III, 1935, Chapter VII.

2. Demolitions, etc., may also be used with an immediate tactical object, to enable a retiring force to extricate itself and secure an unmolested withdrawal without fighting or to relieve pressure on the rear guard. The following are some of the expedients which may be adopted: the demolition of bridges; the blocking of roads or of fords by craters, or other means; the destruction of water supplies; the making of inundations; the firing of woods, heather, villages, etc. Effective demolitions take some time to prepare, and responsibility for the plan should not be left to the rear guard commander. The commander of the main body will normally draw up and put into execution the plan of work, informing the rear guard commander of the details of the plan.

3. As few demolitions as possible should be left to the last minute. The procedure for ordering the firing of the charges for such as have necessarily to be so left will be as follows. The rear guard commander will be responsible for deciding the time of, and for giving the order for, demolitions. He may actually give the order himself for the destruction of an important bridge; more often he will delegate the responsibility to some other officer, who may be the commander of the rear party, the engineer officer in charge of the demolition or some other specially detailed officer. The engineer officer, or N.C.O., in charge of the demolition will be given in writing the title of the officer to whom has been entrusted the duty of ordering the demolition, and any other special instructions as to the time or circumstances of the demolition. Should the intended procedure miscarry (through the officer detailed to order the demolition becoming a casualty, or for any other reason) and it becomes evident to the commander of the demolition party that further delay will, on account of the closeness of the enemy, prevent the demolition being carried out, he will on his own responsibility order the charges to be fired, unless he has written instructions specifically forbidding such action.

4. It will usually be necessary to provide a special covering party for the engineers detailed to execute last-minute demolitions. If a covering party has not been provided, the engineer officer or N.C.O. in charge of the demolition should apply for the necessary protection to the commander of the unit or formation in whose sector his demolition lies.

5. As soon as a bridge has been destroyed, the engineer officer or N.C.O. in charge will report to the headquarters which ordered it the time of demolition and the extent of damage effected.

50. Advanced guard to a force retiring

1. The commander of a retreating force will detail an advanced guard. Its duties will normally be to clear away any obstacles which would delay the march (this may include the regulation of civilian traffic and of refugees) and to improve and mark, where necessary, the route to be used by the main body. It should therefore include a detachment of the provost corps and may include engineers.

2. If the head of the retiring force is liable to be attacked by armoured cars or mobile troops, the advanced guard should include anti-tank weapons and mobile troops for reconnaissance. If the enemy is using gas, his mobile troops may contaminate such areas as cross-roads or defiles; to deal with this, decontamination equipment and personnel to use it should accompany the advanced guard.

Protection at Rest

51. General principles

1. A force halted, whether concentrated or deployed, protects itself on exactly the same principles as a force on the move. That is to say, it sends out protective detachments in every direction from which hostile approach is possible. The objects of these detachments, which are termed outposts, are to prevent the enemy's reconnoitring detachments from obtaining information, to obtain information of the enemy's approach and, if the force is attacked, to gain sufficient time by resistance to enable the main body to prepare for action. In fact the duties of the outposts, as of other protective detachments, are *reconnaissance* and *resistance*; and their strength and composition must be such as will enable them to perform these duties effectively.

2. The service of distant reconnaissance, from the air or by mobile troops, will usually be carried out under the orders of the higher commander, arrangements being made for the rapid communication of the results to the commander of the outposts. In addition, outposts will carry out constant reconnaissance up to a forward line which may be defined for them by the higher commander; they will keep a close watch on all bodies of the enemy within that area, will observe all approaches by which the enemy might advance and will examine all localities in which the enemy might conceal his reconnoitring detachments or which he might occupy preparatory to attack. A proportion of mobile troops may be allotted to the outposts for this purpose. By day, when the enemy is not in close proximity, mounted patrols from the outposts may be sent up to a distance of two to three miles in enclosed country and up to seven or eight miles in very open country. Armoured cars will go further. Standing patrols, which can conceal themselves and see without being seen, are, as a rule, more effective than

moving patrols; but a combination of both may be required. By night, the duty of patrolling will fall chiefly on the infantry.

3. The strength of troops employed on outpost duty and held in immediate readiness to meet attack must be kept to the minimum consistent with reasonable safety; otherwise the efficiency of the force will suffer from lack of rest. When the main enemy forces are not within striking distance, the outposts need be sufficiently strong only to prevent the enemy from obtaining information and to protect the main body from disturbance by hostile patrols of mobile troops. When the enemy possesses mobile troops with a long range of action, the force halted may be liable to attack from other directions as well as from the front. To meet this danger, areas, within which they will be responsible for the protection of all troops, fighting or administrative, will be allotted to the various formations. The commander of each formation will put out detachments to block roads or other avenues of approach leading into his area, on similar principles to those outlined in Sec. **39** for troops on the march. This protection against raids by mobile troops must be maintained also under the conditions dealt with in the succeeding paragraph.

4. If the main enemy forces are within striking distance, the commander of the force must decide on his dispositions to meet an attack and must arrange for the quartering of his troops accordingly. The extent to which the force will be deployed and the degree of readiness in which the various bodies of troops will be held will depend on the proximity and character of the enemy and on the general tactical situation. The force commander will then lay down the general line which his protective detachments will take up in order to cover the main body. This line will form the outpost position, and the troops allotted to its defence will form the outposts. The distance of the outpost position in front of the area which the main body is to defend in case of attack will depend mainly on the existence of suitable ground for defence; it must be sufficiently far in advance to give the main body time to prepare for action, but not so far in advance as to be dangerously isolated. If the enemy is strong in armoured fighting vehicles, the existence of a tank obstacle may influence the choice of the position. The occupation of the position, which may often have to be done hurriedly, and co-ordination between the various sectors

(Sec. **52**, 2) will be facilitated if the general line of defence can follow some well-defined natural feature, such as a line of high ground, a road or a railway.

The outpost position need not be held in great strength, since the enemy cannot hope in the face of modern firearms to launch a major attack with much chance of success without expending considerable time on reconnaissance and preparation. The organization of the position and the methods of defence will be the same as that of any other defensive position (*see* Chapter VII), except that, as the extent of front held is likely to be large in proportion to the strength of the outpost troops, some sacrifice of depth will be necessary.

5. Outpost troops must be always in a high state of readiness for action. They must hold their ground, if attacked, as resolutely as in any other defensive position. They will be withdrawn only by order of the commander of the force.

6. Artillery or engineers may be allotted to the outpost commander for the support of the troops holding the outpost position. If so, they will be handled on the same lines as artillery and engineers in the defence. (Secs. **74** and **75**.)

7. When opposing forces are in close contact on their battle frontages, it will often occur that no orders as to protective measures will be issued by higher authority. Nothing can relieve commanders of the responsibility for securing their commands against surprise; forward formations must bivouac on their battle positions, each unit protecting itself and patrolling to the front, and to the flanks when not in touch with neighbouring units.

8. Detailed instructions for the occupation of outpost positions will be found in the manuals of the various arms. The measures to be taken by troops in quarters in case of alarm are given in Field Service Regulations, Volume I, 1930, Chapter XVI. Some guidance on the use of outposts to break up an attack is given in Field Service Regulations, Volume III, 1935, Chapter VI.

52. Command of outposts

1. At the end of a march, advanced, flank and rear guards remain responsible for the protection of the main body until the outposts are in position. It is more economical and convenient if the same formations as have furnished these

protective detachments during the march are detailed to provide the outposts when the force halts.

2. In small forces, a commander of the whole outpost system may be appointed; he will usually be the commander of the unit or formation furnishing the outposts. In larger forces, commanders of formations will usually be allotted areas and given the general line of the outpost position; they will then detail their own outpost troops and will appoint a commander, who will be responsible for the organization of the outpost system in the formation's area and for co-ordinating arrangements with those of the outposts on the flanks.

3. An outpost commander should be appointed before the force halts; he should be given all the relevant information available of the enemy and of our own forces; he should be told the intentions of the commander who appoints him, the positions to be occupied by the main body if attacked, the time it will take to occupy these positions and the general line to be taken up by the outposts. He can then settle in outline the general dispositions of the outposts, for day and night, and issue orders for reconnaissance.

After reconnaissance, he will issue his orders, which may include the following:—

i. Information, so far as it affects the outposts.

ii. A general description of the outpost position, its division into sectors, the troops allotted to each sector and the location of the reserve.

iii. Any special instructions for defence against armoured fighting vehicles.

iv. Dispositions to meet attack.

v. Any alterations in dispositions by night.

vi. Any arrangements for the control of the movement of the inhabitants or refugees.

vii. Administrative arrangements, especially as regards lighting fires, cooking and smoking; whether the reserve is to occupy billets or to bivouac, which units may take off equipment or off-saddle.

viii. The hour at which outposts will be relieved, if known.

ix. The place to which reports will be sent.

As soon as the outposts are in position, he will so inform the commander who appointed him.

53. Rules for outpost duty

1. Shortly before or after dawn or at dusk are times which are frequently chosen for an attack on an outpost position; an attack at dusk may be made to secure the ground which the outposts hold with a view to entrenching it during the night; or troops may be brought up under cover of darkness to rush the outpost position at dawn. Outposts, like other troops in defence, will therefore stand to arms one hour before dark and one hour before it begins to get light and will send out patrols; they will remain under arms till the patrols report that there is no sign of an attack.

2. The commanders of forward detachments in close proximity to the enemy will avoid useless collisions with the enemy; attempts to carry off posts or sentries, unless ordered for the purpose of obtaining identification or for some good reason, should be avoided, since they give rise to reprisals and tend to disturb the rest of the outposts and of the main body.

3. Troops on outpost duty will always be ready for action and will not remove their equipment without special orders from the commander of the outposts. By day, not more than one or two men should be allowed to leave a detachment at any one time; by night, all men other than patrols will be with the detachment, and not less than one-third of each detachment will be awake manning its fire positions.

4. Outpost positions will invariably be strengthened so far as time permits; it is particularly important to place an obstacle, when possible, before the positions of the forward defended localities. Communications should be improved and tracks marked where necessary. Intercommunication should always be arranged between the various portions of the outposts and between the outposts and the main body.

5. Detached posts may occasionally be necessary in front of or on the flank of an outpost position, in order to guard some locality which cannot be included in the general line of defence, where the enemy might collect preparatory to an attack or which he might occupy for purposes of observation. Such detached posts have the disadvantage of isolation, and the outpost commander must decide whether the value of a detached post is sufficient to justify the risk of its being cut off.

6. No one other than troops on duty, prisoners, deserters from the enemy and flags of truce will be allowed to pass

through the outposts either from within or without, except with the authority of the commander who details the outposts. Inhabitants with information will be blindfolded and detained at the nearest post pending instructions, and their information sent to the outpost commander. No one is allowed to enter into conversation with persons presenting themselves at the outposts, except the commander of the nearest platoon, company or detached post, who should confine his conversation to what is essential. Prisoners and deserters will be sent at once, under escort, to the authority appointed to interrogate them.

Where there are large numbers of refugees it will be impossible to prevent them crossing the outpost position. Special arrangements will be necessary for their collection and for their subsequent disposal.

Other Protective Duties

54. Protection of convoys

1. Commanders of formations and units are responsible for the protection of all transport and supply units whose movements they regulate, and will make such arrangements for their security as the situation may demand. The commander of an area or sub-area on the line of communication is similarly responsible for the security of transport and supply columns in his area.

The route to be traversed by a convoy may be guarded by permanent posts on the route or by troops sent out daily from posts on the lines of communication or by the normal protective arrangements of the formation concerned. Otherwise an escort will be provided to accompany the convoy.

Long columns of transport on a road are specially vulnerable to attack from the air or to attack by armoured fighting vehicles, and the arrangements for their defence must always take into consideration these two dangers. The measures for protection against air attack will be on the lines laid down in Sec. **38,** and against armoured fighting vehicles on the lines laid down in Sec. **39.** If lines of communication are much exposed to attack by air, special arrangements may be necessary, vehicles being run at wide intervals by day or movement taking place at night.

2. When a convoy is being protected by an escort, the commander who details the escort will appoint an officer who will command both the transport and its escort. Should he be the commander of the escort, he will consult the senior transport officer on all matters affecting the welfare and convenience of the transport, will avoid all interference with his technical functions and will give effect to his wishes regarding them, unless by so doing the safety of the convoy would be endangered.

3. In protecting a convoy early information of the approach of the enemy is essential in order that he may be engaged as far from the convoy as possible; protection will best be afforded if the escort holds in succession important tactical points and avenues of approach at a sufficient distance to keep the enemy outside effective rifle range of the route which the convoy is following. The escort should therefore consist of mobile troops as far as possible. Armoured cars are particularly valuable; useful substitutes may sometimes be improvised from lorries; requisitioned motors may be used to move machine guns and their crews from one important tactical feature to another. Artillery is of value in suitable country through its power to engage the enemy at long range. The value of infantry will be enhanced if they can be carried in mechanical transport.

4. The commander of a convoy will try to avoid attracting the enemy's attention, and will on no account engage the enemy if his task can be accomplished without fighting. If fighting is inevitable, the enemy will be kept as far as possible from the convoy, which will be kept moving, unless the existence of good cover makes it advisable to halt until the attack is beaten off. Close protection of a convoy is usually of little value, since, once the vehicles come under effective fire, and animals, engines or drivers become casualties, the whole convoy is likely to be brought to a halt.

CHAPTER VI

THE ATTACK

55. General considerations

1. The considerations which should guide the higher commander in his decision to assume the offensive; in his choice of envelopment or penetration as the most effective method of attacking the enemy's position; and in his selection of the arm, or combination of arms, on which he intends principally to rely for the gaining of his object are dealt with in Field Service Regulations, Volume III, 1935, Chapters III and V.

2. Whatever the size and composition of the forces engaged, the planning and conduct of an attack are governed by certain general principles which it is essential that every commander should thoroughly understand, in order either to plan an attack himself or to play his part effectively in an attack staged by a superior commander.

3. The chief assets of the attacker are: firstly, the feeling of moral superiority which an offensive attitude gives, similar to that of the boxer who carries the fight to his opponent; and secondly, the power to choose at what place, by what method and at what time the main action will be fought. To maintain this moral superiority, a commander must be perfectly clear as to the objective he seeks to attain, must be determined to succeed and must impress this determination on his subordinate leaders by resolute action and by clear and definite orders. The power to choose place, method and time must be exploited to the full so as to obtain superiority, especially of fire, at the chosen point, and so as to secure the vital advantage of surprise. Surprise is a most powerful weapon in the attack, and the commander who fails to surprise his enemy loses the main advantage which the offensive confers. Some of the means by which surprise may be sought have been outlined in Sec. **11, 5**; to attack at an unexpected place, by an unexpected method or at an

unexpected time; to avoid stereotyped procedure and tactics; and to keep thinking always a little ahead of his opponent must be the aim of every commander.

4. The main problems which the attacker has to solve in making his plan are:—

Firstly, choice of place; he has to consider which ground best suits the characteristics of his force; which ground offers the best opportunities for surprise; and which ground, if captured, will bring the best opportunities for exploiting success; and to decide to which of these considerations he will give most weight, when, as is most usual, they are conflicting.

Secondly, choice of method: this means how best to deceive the enemy as to the place or places selected for attack and how best to apply the troops and fire power at his disposal to deal with the enemy's weapons and defences; whether to attack with or without artillery preparation; whether to place his armoured troops or his infantry in the van; how to maintain the impetus of the attack to a sufficient depth to overcome the enemy's resistance; and how to exploit any success gained.

Thirdly, choice of time: is the attack to be launched by daylight or under cover of darkness? how much time can be given to preparation? at what hour is the enemy most likely to be taken by surprise?

5. The chief preoccupations of the attacker during the attack may be summarized as follows:—

i. How to obtain timely information on which to base his action.
ii. How to maintain communication, so as to control or supervise his subordinates.
iii. How to use his reserves effectively and in time.

All these problems of the attacker are further discussed in Field Service Regulations, Volume III, 1935, Chapters IV and V.

6. The form and method of attack will vary according to the nature of the ground (e.g. open or enclosed, flat or mountainous), the armament, tactics and morale of the enemy, the accessibility or otherwise of his flanks, and more especially, according to the time and resources which the enemy has had available for the organization of resistance.

The position to be attacked may vary from ground hastily occupied—for example, by the enemy's protective forces to cover the deployment of the main body or by a force sent to oppose an outflanking movement—to a deliberately prepared and highly organized defence with elaborate entrenchments and obstacles.

7. Except in certain phases of position warfare (*see* Chapter IX), the enemy's dispositions—especially those of his machine guns and anti-tank guns—are not likely to be accurately ascertainable beforehand, however careful the preliminary reconnaissance by ground and air. In the opening stages of the attack, the superior fire power of the attacker, if properly applied, will enable him to engage with considerable prospect of success the areas most likely to conceal the enemy's main fire power; but in the later stages the destruction or neutralization of the enemy weapons will almost entirely depend on the information received from the forward troops as to what is barring their progress, and on the closeness of the touch maintained between the forward troops and the fire power which supports them. Where the enemy has had time to organize his defence in depth, the attack will only succeed if also organized in depth, i.e. with sufficient reserves to meet unexpected situations and to confirm and exploit success. The exercise of control and supervision over the attack is for the commander of every degree the most vital problem of all; it is primarily a matter of intercommunication and of getting back information from the forward troops.

8. The time factor always requires the most careful consideration. On the one hand, an attack launched without adequate reconnaissance and preparation is unlikely to succeed: on the other hand, when a favourable position for the attack has been gained, delay and hesitation are fatal, and enable the enemy either to strengthen his defences and complete his arrangements to meet the attack or to avoid the blow by withdrawal. Every device therefore must be adopted to shorten the period of reconnaissance and preparation (*see* Sec. **56**).

9. Such are in outline the main problems of the commander who has to plan and execute an attack. They are applicable to every commander acting independently, however small his force. The junior commander will more often be given his task and objective in a plan already worked out by the higher command; and the attack, so far as his part in it is concerned, will be a frontal one, although it may be in the course of a successful enveloping movement. Whether his role be one of assault on a part of the enemy's front or of support to the troops detailed for the assault, his principal business is likely to be to apply the fire power which he controls towards destroying or subduing that of the enemy, and by skilful use of ground and of weapons to close with the enemy—or to enable the assaulting troops to do so—with as little loss in men as may be and with no loss of spirit.

56. The preparation of an attack

1. A period of preparation for an attack is always necessary to allow for reconnaissance by commanders; the formation of their plans; the issue of orders; the deployment of the troops; the measures necessary to ensure the effectiveness of the supporting fire; the selection and establishment of headquarters; the arrangements for intercommunication. To shorten this period of preparation without omitting any essential requirement must be the constant aim of commanders and staff. The activities preceding an attack should be simultaneous in all grades of command rather than consecutive; if subordinate commanders have to wait till every detail of the plan of the commander next above them is fixed before they are given any instructions as to their role, much valuable time will be wasted. Foresight and quickness on the part of the higher commanders in deciding on the general outline of their plans and in communicating them to those below will enable subordinate commanders to reconnoitre, to move the troops into position and to make other preparations while the details of the plan are being settled.

2. As an example, the period of preparation within a unit such as an infantry battalion may take place in stages somewhat as follows. In the first stage the battalion commander carries out his reconnaissance, accompanied by the commander of his supporting fire units, a staff officer (adjutant or intelligence officer) and one or more orderlies to carry messages. Before starting on his reconnaissance, he will give his subordinate commanders (rifle company commanders) a rendezvous where they will receive orders; he will also issue, from a study of the map, such instructions as will enable them to begin their own reconnaissance and

preparations; the supporting fire unit commanders will give similar instructions to their subordinates. Meantime the remainder of the battalion under the second-in-command will be directed to an assembly area or areas where any necessary administrative arrangements may be made; while the battalion signal officer may be reconnoitring to find a suitable headquarters and making preliminary arrangements for establishing intercommunication.

The next stage comes when the battalion commander, having completed his reconnaissance and formulated his plans, meets his rifle company commanders at the rendezvous which he has indicated and issues verbal orders (*see* Sec. **15**, 3), while the supporting fire unit commanders instructs subordinate commanders on their supporting role. The rifle company and fire unit commanders then complete their own reconnaissances, if they have not been able to do so in the first stage; while the troops detailed for the attack are moved to up areas close behind the line of deployment.

In the final stage, the same process is carried a step lower; the company commanders issue orders and the troops take up their starting positions, the platoon commanders in their turn pointing out their objectives and giving their tasks to the section commanders.

The above outline gives some indication of how by foresight and training much time may be saved, but must not be taken as invariably applicable. The process will vary according to the time available for preparation.

3. Orders for the attack will include the allotment of objectives to units or formations; details of the fire plan to support the attack; the fixing of zero hour, which is usually the hour at which the forward troops cross their starting line (*see* Appendix IV, Sec. III, 2); the essential administrative arrangements; the position of headquarters; and the arrangements for intercommunication.

The selection and allotment of objectives is one of the principal means by which a leader exercises control over the attack. The extent and distance of the objectives define the effort required of each body of troops; they will vary according to the opportunity which the enemy has had to prepare his defence, the features of the ground, the fire support available, and, sometimes, the importance of the time factor. They should be within the calculated capacity of endurance of the troops, moral and physical, and within the power of the weapons and ammunition available to support them.

Objectives will be selected for their tactical importance and should be easily recognizable on the ground. A formation or unit which is allotted an objective may lay down an intermediate objective to be captured first by a part of its troops.

4. It will usually be convenient to lay down a dividing line between adjacent *formations* in the attack (*see* Appendix IV, Sec. IV, 8). The respective tasks and responsibility of adjacent *units* or *sub-units* will often be sufficiently clearly defined by the allotment of objectives, and a dividing line may be unnecessary, unless it is desirable for some special reason to define exactly the area within which each is responsible. Dividing lines must be marked by features easily distinguishable on the ground. It must be clearly understood by all that the naming of a dividing line never absolves a commander from the duty of assisting by all means in his power the progress of the units to his right and left; nor does it prevent him from organizing covering fire from positions outside the avenue allotted to him, nor from moving his troops into another area whenever the situation requires it.

5. It is important that a commander, who has artillery under his command, should realize his responsibilities. It is his duty to decide where he wishes the shells to fall, also when and for how long the different targets should be engaged. It is then the duty of the artillery commander to decide on the methods to be employed to carry out the orders he has received.

57. General conduct of the attack

1. Whatever the form of the attack, it will usually fall into two separate stages; the initial stage, which has been planned, prepared and probably timed; and a subsequent stage when the fighting is looser and less organized and depends more on improvisation. This latter stage demands a much higher degree of skill, endurance and determination from all ranks, especially from subordinate commanders.

2. In the initial stage, if the preparations have been well made, the attacker has the advantage of surprise, superior fire power and a considered plan. This stage should therefore result in penetration of the enemy's front by the forward troops at one or more points. The attacker's object will now be to enlarge his gains while he still holds the advantages of

surprise and fire power and the enemy is confused and disorganized. Since the penetration will probably be on a comparatively narrow front, it will be necessary to extend the frontage on which the enemy's defences have been pierced before, or simultaneously with, any deeper penetration into the enemy's position; otherwise the attacking troops may find themselves in a narrow salient with exposed flanks.

3. It is in this stage of extension of the original success that the attacker's chief difficulties begin. The programme of pre-arranged covering fire may at some points have failed to overcome the enemy's opposition, so that portions of his original front are still holding out. These points are usually best dealt with from the flanks or rear by a part of the troops which have pushed on past them; such co-operation requires good team-work and initiative on the part of subordinate commanders.

The further progress of the attack depends on the ability of the superior commanders to employ their reserves of tanks, of men and of other fire power so as to maintain the forward impetus, and on the skill and determination of subordinate commanders in finding and exploiting the enemy's weak points. Artillery support of the leading troops should now be direct and rapid and the problem is mainly one of good liaison and intercommunication. The chief difficulty of commanders with reserves at their disposal will be to get a clear picture of the situation in front; it is the imperative duty of the forward troops to assist them by sending back frequent reports of the progress of the attack, without which the superior commander is unable to influence the battle in the right way. The use of reserves is further discussed in Field Service Regulations, Volume III, 1935, Chapter V.

4. When the advanced troops have reached the objectives allotted to them, and the enemy is still holding a further position, or when they are definitely held up before reaching their final objective, it will usually be necessary to prepare a new attack with fresh troops; the procedure will be as outlined in Sec. **56**, and time will be of the utmost importance.

5. Woods and villages will often require special consideration in the planning and execution of an attack. The chief factors which they introduce are the same as those of fighting in very enclosed country, i.e. increased difficulties of observation, of control, of maintaining direction and of co-operation between the arms; the moral effect of these factors is considerable

and may be compared with the moral influence in fighting by night. For these reasons it will often be advisable to avoid direct attack of a wood or village on the front of attack, to outflank it by advancing past it on either side and thus to surround it, leaving its garrison to be dealt with at leisure. If this method is adopted, it will be necessary to keep under fire the edges of the wood or village from which the enemy may bring fire on the advance or may counter-attack.

If a large wood, village or town has to be attacked directly, operations must be methodical and carefully prepared, if they are to succeed; it will usually be advisable to divide the objective into areas, each of which will be captured in turn. Further guidance for the attack on woods and villages will be found in Infantry Training.

6. If the enemy is using gas, he is most likely to contaminate observation areas, and probable avenues of approach and forming-up places; special precautions will be necessary to ascertain whether such areas are clear or not. He may also attack troops concentrating for the offensive with gas spray from low-flying aeroplanes. If he has had time to collect gas shells in large quantities, he may use them in harassing fire, counter-preparation and defensive fire.

58. Opposed river crossings

1. The development of armoured fighting vehicles has enhanced the importance of a river (or canal) as a defensive obstacle. At the same time the weight of fighting and of transport vehicles has increased the technical difficulties of passing a force over a river in the face of opposition (*see* Appendix VIII). Since technical considerations will have a most important and possibly decisive influence on the commander's plan, the engineer officer concerned must be taken into consultation at the earliest possible stage. The fullest and earliest information about the river line is needed (Appendix IX); air photographs will be of value in framing the general plan, but personal reconnaissance by engineers is essential.

2. A river line of which the enemy has had time to organize the defence should be turned rather than attacked, if the situation permits. If, however, a passage has to be forced, the elements of success are careful preparation, surprise and speed. One of the chief dangers to the attack arises when the leading troops have crossed, but are without their supporting

weapons; this period must be reduced to a minimum by arrangements to pass the supporting weapons across rapidly. In fact the whole operation, once begun, should be carried through as swiftly as possible, so as to shorten the time during which the force is divided by the obstacle of the river. If a river can be reached before the enemy has had time to organize the defence, the leading troops must make every effort to establish themselves across it as rapidly as possible, using improvised means of crossing if the bridging material carried with the force is not at hand.

3. A passage should be made at as many points simultaneously as possible, but the number will usually be limited by the means of crossing available. A re-entrant bend of the river offers good facilities for covering fire and is therefore often selected as a crossing place. The enemy is, however, likely to have made arrangements to bring fire into such obviously likely points of passage. Against an organized defence, the first crossing will usually be made under cover of darkness. Arrangements to defend the crossing places against enemy air attack should be made.

4. The successive stages in the operation of forcing a crossing against an organized defence will usually be :—

i. Reconnaissance and the making of plans.
ii. Preparation, including the forward movement and concealment of troops and bridging material and arrangements to deceive the enemy as to the points of passage.
iii. The passage of attacking infantry by assault bridges, boats or other means, and establishment of bridgeheads.
iv. The construction of bridges or ferries for supporting arms (Appendix VIII).
v. The passage of the remainder of the force and the maintenance and improvement of communications across the river. Good traffic control will be of great importance.

5. Detailed information on river crossings will be found in Engineer Training and Infantry Training.

59. Exploitation and consolidation

1. The exploitation of a success depends mainly on the leadership of the subordinate commanders. When a body

of troops has reached the objective allotted to it it is apt to suffer from a reaction, to consider that its part in that particular attack is over for the time being and to become inactive. Leadership and energy are required more than ever from subordinate commanders at this stage. There is much to be done.

The first action should be to push out patrols to keep touch with the enemy and to ascertain the situation in front and to the flanks. There is often a period after a successful attack when ground beyond the allotted objective can be occupied with little or no resistance, while the enemy is still surprised and disorganized. Whether or not a subordinate commander should push forward beyond the line given him as his final objective must depend on the instructions which he has received, his knowledge of the superior commander's intentions, the situation to his right and left and his tactical judgment as to the value of the ground in front. Generally speaking, a bold decision should be taken, unless it will lead to dangerous isolation. In any event, information of the opportunity and of his action should be sent back at once to the next higher commander.

2. Consolidation has as its purpose to secure the objectives which have been reached, or other important localities which have been occupied, against counter-attack and as a base for further advance. The process includes the organization of the position for defence; the reorganization of the troops; the replenishment of ammunition, etc.; the establishment of communication both to the rear and to the flanks; provision for observation and information; arrangements for supporting a further advance.

The defence should be established in depth on the principles laid down in Secs. **69** and **73**; the forward localities being lightly held and as many troops as possible withdrawn into local reserve. If counter-attack by armoured fighting vehicles is possible, anti-tank defence will be important and it may be advisable to site sections of field artillery well forward, especially to deal with a tank attack.

If the ground won is of tactical importance to the further conduct of the battle, or is likely to be occupied for any length of time, tools should be sent forward and entrenching should be begun as early as possible. Engineers may be sent forward to put some locality of particular importance into a state of defence.

3. The conduct of the pursuit is dealt with in Field Service Regulations, Volume III. Forward troops, when the enemy is withdrawing, will act as in Sec. **44**, 1. A pursuit, when the enemy has been defeated and demoralized, calls for the maximum effort on the part of all ranks, who must be prepared to exert themselves to the point of exhaustion, in the hope of completely destroying the enemy force.

60. Armoured units in the attack

1. The employment of tank brigades in offensive operations is dealt with in Field Service Regulations, Volume III, 1935, Chapter V. The present section deals with the employment of army tank battalions in co-operation with the other arms.

2. Army tank battalions may be used in the attack, either in the initial stages to break through the enemy's front defence or in the later stages in order to maintain the impetus of the attack and to confirm success. They will be especially valuable in the early stages if the enemy has had time to erect a wire obstacle. Concealment of the approach of the tanks will be essential and will necessitate measures to prevent their presence being disclosed by the noise of their movement, as well as by observation. If tanks are used in the initial attack, the greatest possible measure of support from artillery and machine guns will be provided; the fire plan will, in fact, be arranged mainly with the object of supporting the action of the tanks; a smoke screen, stationary or moving, laid down by the artillery, will often provide effective cover and will be economical of ammunition. Machine-gun support to a tank attack is valuable, since the tanks cannot be injured by it and it can be continued after the tanks reach their objective.

If tanks are used in the later stages, supporting fire will still be necessary but will be more difficult to arrange; on the other hand, their mobility will enable them to act by surprise and to take rapid advantage of opportunities for effective action which will occur while the enemy is disorganized after a successful attack by the other arms.

3. The frontage which an army tank battalion can cover depends on the lie of the ground, the strength of the enemy's position, the degree of supporting fire available and the visibility at the time of attack. Under exceptionally favourable conditions a company may be expected to cover a frontage of 1,000 yards; this may be reduced to 500 yards

when conditions are difficult. A battalion with all three companies deployed may thus be expected to cover from 1,500 to 3,000 yards of frontage, but it must be remembered that tanks like other arms require a reserve and can seldom be fully deployed (*see also* para. 6, below).

4. Since tanks are liable to suffer casualties from the enemy's artillery fire if they remain long on a position which they have taken, it is necessary that their action should be followed up as rapidly as possible by infantry or mounted troops (usually the former, as mounted troops are so vulnerable on the battlefield). The objective of the tanks will therefore be a limited one, and they will return to a rallying point in rear as soon as relieved by other troops. It is not, however, necessary that tanks should rally right back out of the battle once their immediate task is accomplished. Cover from direct view and the opportunity for reorganization are the main requirements. Cover can usually be found well forward and, once the reorganization, which takes but little time, is effected, the unit or sub-unit is again ready for action.

5. Tanks attacking as the main assaulting arm in direct co-operation with infantry may use the same lines of advance as the infantry or may attack from a flank (i.e. at right angles or obliquely to the lines of advance of the infantry) according to the existence of wire, to the suitability of the ground for movement and supporting fire, and the opportunities for surprise. In order to ensure co-operation between the artillery, infantry and tanks taking part in the attack, the following must be settled: the starting line of the infantry, the starting line of the tanks, the times at which each will cross their starting lines and the pace at which each will move to their objective. Tanks should seldom be required to halt on a starting line. They should be brought, if possible, direct into the attack from an assembly position under cover, crossing a starting or check line at a given hour, but without a halt. The closer the infantry can follow the tanks on to the objective, the better; it can then take full advantage of the confusion created by the tank attack, and can take over the ground gained by the tanks without delay. It may sometimes be advisable for the infantry advance to start before the tank attack is actually launched, so that the infantry can work forward to suitable positions within striking distance of the objective. Such action may also

serve to cover the advance of the tanks. If this method is adopted, sufficient covering fire for the infantry must be provided to make its advance feasible.

When infantry is the main assaulting arm, tanks may be allotted so that they can be made available at short notice to deal with any opposition that is preventing the infantry from establishing itself on the objective. Or infantry may be used to capture the initial objectives, the tanks being reserved to provide the necessary impetus and support for a further advance. It may sometimes be advisable in the later stages of an attack, when the fighting is very open and when few tanks are available, for the infantry to lead the advance, with the tanks following as a reserve to deal quickly with any opposition that checks the infantry.

6. The circumstances and methods of every attack in which tanks and infantry co-operate will vary according to the ground—to which tanks are very susceptible (*see* Sec. 2, 2) —the supporting fire available and the time which the enemy has had to organize his position. There can be no set form of attack which will meet all occasions: success will depend on the following factors:—

i. All available information, from aeroplane photographs and other means, regarding enemy gun and anti-tank gun positions should be given to the tank commander; and all possible opportunity of personal reconnaissance, from the ground or the air, should be afforded to him and to his officers.

ii. The tank and infantry units concerned should have a good understanding of each other's limitations, they should establish personal contact before the action as far as possible, and close liaison during it; it is the business of each to kill the other's foe, the tanks to dispose of the enemy machine guns, the infantry to look out for and silence the hostile anti-tank weapons.

iii. While the battle should be planned beforehand between the infantry and tanks in as great detail as possible, a margin must be allowed for the unforeseen and incalculable; hence there should always, if possible, be a reserve of tanks, to deal with the machine gun which opens from a flank after the forward tanks have passed or with a counter-attack by enemy tanks.

The matters which should be settled beforehand between the units concerned should include the length of the bounds, which in close country may be from hedge to hedge or from trench to trench, the approximate timing and the means of maintaining liaison during the attack.

7. Whenever tanks are allotted to co-operate with an infantry formation or unit, it must be clearly stated in the order which so allots them whether they are "in support of" the formation or unit concerned, command being retained by the higher formation, or "under the command of" the formation or unit to which they are allotted. An officer of each army tank unit allotted to a formation should remain at the formation headquarters, and should be in W/T communication with his unit.

61. Mounted troops in the attack

1. The tasks given to mounted troops in the attack should be such as to make use of their mobility and fire power without exposing them to the risks of close fighting. They may be employed to reconnoitre; to protect the flanks; to operate against those of the enemy; to assist in enveloping movements; to delay the approach of hostile reinforcements; to hold ground taken by armoured units; to act as a mobile reserve; and to take part in the pursuit.

2. In the opening stages of the attack, when the fighting is close, unless they are required for protection of the flanks, for reconnaissance or for the delay of hostile reinforcements, they are best kept in reserve for opportunities which may arise later in the battle or for pursuit. They should be kept in hand as far as possible, and employed only on such detachments, reconnaissances and minor operations as are really essential; they cannot be expected to exert their full power in the later stages or in pursuit if they are exhausted or scattered beforehand.

3. Mounted troops are of such value for reconnaissance and protective duties before and after a battle, and for pursuit or covering a withdrawal, that they should only be employed in the actual battle when it is considered that the chance of obtaining a decisive success justifies their exposure to the risk of heavy casualties. To judge of the right moment for the entry of mounted troops into the battle is extremely

difficult; opportunities are fleeting and hard to perceive. If it is intended to use mounted troops to pass through the infantry and exploit success, the operation must be carefully prepared; it cannot be left to the inspiration of the moment. The commander of the mounted troops, who should be well forward, must be given considerable latitude in selecting the time at which to launch his attack, and arrangements must be made for him to obtain early information, by ground and air reconnaissance, of the progress of the fighting. Special air reconnaissance will usually be required. Effective touch between the infantry and the mounted troops must be maintained by special reconnoitring detachments, by liaison officers and by the establishment of headquarters in close communication. In order to save time and to allow of an immediate start when it is considered that the right moment has arrived, the general plan of attack of the mounted troops and the probable lines of advance and objectives will, so far as is practicable, be decided beforehand and communicated to subordinate leaders. The mounted force should be assembled as far forward as the situation and cover available permits.

4. The use of cavalry in pursuit is dealt with in Field Service Regulations, Volume III, 1935, Chapter V.

62. Infantry in the attack

1. Except in an engagement fought entirely between mounted or mechanized forces, infantry will be required in the attack, either to carry out the assault or to occupy the ground won by the action of the other arms. Infantry has of itself only a limited offensive power except against unorganized opposition, and needs the greatest possible measure of support from the other arms or the cover of darkness or smoke; to take advantage of such support, it must be led with skill and determination.

2. The main requisites of infantry leading in the attack may be summarized as follows:—

i. The attack should be organized in depth, so that reserves are at hand to support the action of the leading troops, to take advantage of their success, to replace them when exhausted and to carry forward the advance without a check.

ii. Every portion of the attacking force must be given a definite objective. To assist in maintaining direction, which is one of the chief difficulties, the objectives should be easily recognizable; in addition note should be taken of prominent landmarks, and the compass bearing of the direction of advance should be given in orders. Attacking troops should start square to their objective from a starting line well defined, if possible, by some natural feature such as a road, path, or ditch. The plan should not involve intricate changes of direction, which are dangerous. Infantry always tends to face towards the quarter from which it meets opposition and may lose direction from this cause.

iii. Every body is responsible for its own protection, to the front and to the flanks.

iv. A body of infantry should not deploy into extended formation until obliged to do so; extension increases the difficulties of control and lessens the opportunities for taking advantage of cover. Extensions should not be wider than five paces between men, or control will be lessened. If a wide front has to be covered, the interval between sub-units should be increased, and not between individual men.

v. Infantry should not open fire as long as it can get forward without it: a fire fight must be to the advantage of the defender, who knows the range and can more easily replenish his ammunition supply. Also a steady advance without pause has a considerable moral effect on the enemy, while the continual change of range will reduce the efficiency of his fire.

vi. Men held up should not be reinforced with additional men; either the attack should be pressed at other points where progress is still possible, or additional fire power should be provided.

vii. The duty of a body of troops which is held up is to continue to engage the enemy and to fix him, so as to give units to the right and left the opportunity to get on; and to push forward itself as soon as their action or the weakening of the enemy makes it possible.

viii. It is the duty of the advanced troops to keep commanders behind informed of the situation by

frequent reports, so that they may be enabled to handle their reserves and supporting fire to the best advantage.

ix. Finally, the leader of every body of infantry, once committed to the attack, must be determined to get forward until his objective is reached.

As regards consolidation on reaching the objective, *see* Sec. **59.**

3. The pace at which infantry may be expected to move towards its objective must be taken into account since it affects the rate of movement of artillery or machine-gun barrages or the time for which concentrations of supporting fire must be maintained. In exceptionally favourable conditions lightly equipped infantry may advance at a rate of 100 yards in a minute; in difficult conditions the rate may be as slow as 100 yards in three or even four minutes. The rate may vary at different stages of the attack, according to the conditions of ground and the state of freshness or tiredness of the troops.

It is essential that the attacking infantryman should be as lightly equipped as possible; the more rapidly he can move from cover to cover, the less casualties he will suffer; the less heavily he is burdened, the longer will he endure without relief.

4. Supporting fire by the infantry itself is provided mainly by machine guns and mortars. The principal roles of machine guns in the attack are to support the advance by covering fire, to protect the flanks and to assist in consolidation. Their fire is of especial value to support troops in the initial stages of the attack by means of a pre-arranged programme: all or part of the machine guns in reserve may be used to increase this supporting fire. During the actual progress of the attack, when the pre-arranged fire programme is over, machine-gun support is harder to arrange owing to difficulties of observation and the flat trajectory of the weapon; the infantry will depend rather on the rifle, the light machine gun, and the mortar. A proportion of machine guns will usually go forward to give the leading troops close support, when possible, or to assist in consolidation; the remainder will form a reserve of fire power for the protection of the flanks, for meeting counter-attacks or for other tasks that may arise.

The primary role of mortars is to provide quick support,

especially against machine guns, for the leading rifle companies during the progress of the attack. For this task the mortar is fitted by its high trajectory, which allows it to be brought into action almost anywhere, its small size and the powerful searching effect of its high explosive bombs or screening effect of its smoke bombs. Mortars may also be used in the initial fire plan, subject to their limitations of range, the requirements of safety for our own troops and the problem of ammunition supply. If mortars are so used and may be required to give support during the later stages of the attack, additional ammunition should be brought up from the rear and dumped. Mortar detachments will usually go forward close behind the attacking troops so as to ascertain rapidly the location of any resistance holding up the advance and to engage it with the minimum of delay.

5. For the co-operation of infantry with tanks in the attack, *see* Sec. **60.**

63. Artillery in the attack

1. Artillery when deploying to cover an attack should be disposed with a view to concentrating the maximum fire on the targets considered the most important, and to supporting the main attack to as great a depth as possible. This last requirement means that the bulk of the artillery must be sited well forward so as to reduce subsequent movement. The requirements of surprise will necessitate that the artillery supporting an attack should, as far as possible, be concentrated and placed in position without being observed and should open fire with the minimum of registration, i.e. by predicted shooting. To evade the observation of enemy airmen, it will usually be necessary to effect large movements of artillery by night into positions carefully chosen by day with a view to concealment. To obtain absolute surprise by predicted shooting without any registration requires a detailed survey of targets which will not usually be possible in mobile operations; it should, however, be possible to achieve partial surprise by placing reinforcing batteries on the same survey grid as batteries already in action (e.g. advanced guard batteries) and carrying out all necessary registration by those batteries which have already been disclosed.

2. The artillery plan must be simple and must be governed by the time available for preparation. Details of artillery tasks should be arranged direct by artillery officers with the commanders of the troops which they are supporting.

The methods by which artillery support an attack have been outlined in Sec. **5.** Whether or not artillery preparation is undertaken, and its duration and intensity, depend on the strength of the enemy defences and the methods by which surprise is being sought. A barrage is the simplest method of giving support during the assault, when the enemy positions are not accurately known, since barrage fire ensures that all ground over which the attacking troops pass is subjected to some measure of fire. But the ammunition available in open warfare will only permit of this form of support over a very limited front and for a limited distance; as a rough general guide, it may be taken that a field artillery brigade will not fire an effective barrage on a front of much more than 400 yards, while the depth to which it can be fired will depend on the estimated rate of advance of the attackers in accordance with the difficulties of the ground and the opposition expected, and on the ammunition available. It must be remembered that the greatest danger to the infantry will often come from weapons (and especially machine guns) situated beyond their flanks and outside the limits of a narrow barrage.

Concentrations of fire on selected areas are more economical in ammunition and will be effective when the enemy's dispositions have been ascertained in some detail or can be estimated with a good degree of probability. When the number of guns and the ammunition available do not permit of an effective barrage being fired on the front of attack, and when the enemy's dispositions are not accurately known —both of which conditions may be confidently expected in open warfare—a combination of smoke and concentrations will usually enable the best use to be made of the artillery fire available. To combine concentrations and smoke screens in the most effective manner according to the circumstances of the attack will require both knowledge and imagination.

The bulk of the medium and heavy artillery available is likely to be employed on counter battery fire, but may also be employed on bombardment of the enemy positions.

3. Artillery fire may be either destructive (which is only possible when the target has been accurately located); neutralizing fire (which is possible when the enemy, though not accurately located, is known to be in a certain area within the power of the artillery to cover); or screening fire (e.g. smoke or dust), which will not prevent the enemy's machine guns from firing on fixed lines through it. It is generally advisable for artillery commanders to consult with the infantry commander they are supporting as to the nature of the fire they should apply.

4. Whatever forms of fire are used, it will be usual for the fire plan in the initial stages of an attack to be based on a "timed programme," dependent on the expected rate of advance of the attacking troops. The duration of the timed programme will depend on the dispositions of the enemy, the facilities for observation and the ammunition available: the more deliberate the attack, the more prolonged may be the timed programme; but when the enemy dispositions are not definitely located and it is impracticable to estimate the rate of advance of the attackers, a prolonged timed programme is inadvisable. Covering fire ceases to be of value if it gets too far ahead of the attacking troops; to guard against this, a timed programme may be fired with pauses on certain pre-arranged lines, or the provisions for timing may be supplemented by the use of light signals or other means of communication. Caution in the use of light signals is, however, necessary to ensure that they are available at the place and time required, are recognizable and are unmistakable.

5. The support provided by artillery in the later stages of the attack, after the conclusion of the timed programme, will depend on the initiative of subordinate artillery commanders and on close co-operation between them and the attacking units. Throughout the attack artillery observers must be well forward; observation is essential not only of the results of the artillery fire but of the position of the forward troops. Batteries also must be prepared to move forward as the advance progresses.

6. During the initial stages, the command of the artillery should be centralized so far as the communications available permit; in the later stages, a large measure of decentralization will be necessary, and artillery may be placed under commanders of forward units to enable them to deal quickly with unforeseen resistance or to meet counter-attacks by armoured fighting vehicles or other troops.

64. Engineers in the attack

1. The principal duties of engineers in an attack in open warfare may be :—

i. The improvement of communications to facilitate the assembly and deployment of the force, especially the provision of bridges over water obstacles or gaps (*see* Appendix VIII regarding types of military bridges).

ii. The preparation for defence of important tactical points captured during the attack (Sec. **59,** 2).

iii. The collection of information regarding work likely to be required during and after the attack, and preparations to carry it out ; this means forward reconnaissance, but engineer units should not be sent forward until there is some specific work for them, which may be the improvement or construction of communications ; the repair of bridges ; the removal of obstacles or mines ; the provision of water points in the forward areas, etc.

65. Signals in the attack

1. How to maintain intercommunication is one of the chief problems of an attacking force. One of the first essentials is that signals should be given early information of the intention to attack and of the general plan. The routes to be followed by headquarters during the attack should be settled as early as possible.

2. It may sometimes be advisable to order a period of wireless silence before the opening of an attack in order to conceal the concentration and preparations for the attack.

3. Wireless should be regarded as the primary means of communication throughout the division during the attack, particularly in the forward area, i.e. in advance of brigade headquarters. The precautions to be observed in the use of wireless in battle are given in Sec. **19.** It will be supplemented by despatch riders and cable. Cable communications are, however, very difficult to maintain in the forward area, since they are liable to be constantly cut by the enemy shell fire or by the movement of vehicles, especially of tracked vehicles.

4. It will be the duty of signals to provide efficient ground communication between the units of the air force co-operating in the attack and the formations with which they are working.

5. *See* Sec. **16,** 8, as regards the use of liaison personnel.

66. Aircraft in the attack

1. Local air superiority (*see* Sec. **8,** 1) over the area of attack is essential in order to enable the aircraft detailed for close reconnaissance and co-operation to carry out their tasks without undue interference from enemy air forces ; also to prevent as far as possible the enemy from making a detailed reconnaissance of the movements and dispositions of the attacking troops and from directing the fire of his artillery on to them.

2. Bomber squadrons can be used effectively to attack the enemy's troops and transport, to disturb his rest and to lower his morale. In exceptional circumstances fighter squadrons can carry out low-flying attack on enemy troops, but the possible effect on the general air situation of their withdrawal from their normal function and the heavy casualties to be expected with a well-trained enemy of good morale must be considered before such attacks are ordered.

3. Throughout the attack, army co-operation squadrons will carry out the duties of medium, close, artillery and photographic reconnaissance. Efficient means of intercommunication between the squadron commander and the commander of the formation with which he is working are essential.

CHAPTER VII

THE DEFENCE

67. General considerations

1. The considerations which will guide a commander in deciding to adopt a defensive attitude are given in Field Service Regulations, Volume III, 1935, Chapter III. The selection of a position, the organization of the defence, the employment of the outposts, the location and handling of the reserves and the change to the counter-offensive are discussed from the point of view of the higher commander in Field Service Regulations, Volume III, 1935, Chapter VI.

The present chapter deals with the general principles and the conduct of the defence, as they affect all commanders down to the most junior. It applies to defence intended to resist a serious attack, not merely to temporary delaying action, as by a rear guard, which is dealt with in Secs. **47** and **48**.

2. The adoption of the defensive does not necessarily imply weakness or inferiority. It may be necessary to gain time for the arrival of reinforcements or for the execution of a decisive manœuvre in some other part of the battlefield or of the theatre of operations. It may also be desirable to induce the enemy to commit himself to ground favourable to the counter-offensive and to waste his strength in attacks on a well-prepared position; just as some of the most effective falls in wrestling are given by inducing the opponent first to exert his strength in a certain desired direction.

3. The advantages which the defence confers on the defender are the opportunity to choose ground so that the full fire power of his weapons can be developed; to strengthen it as time permits; and by concealment to avoid the fire of the enemy's weapons and to gain surprise. The chief object of the defender is to make the best use of these advantages in order to reduce and exhaust the enemy's forces with the minimum expenditure of his own. He may then eventually

be able, either in the same part of the battlefield or elsewhere, to pass to the offensive and complete the defeat of the enemy; or it may, in certain situations, be sufficient if the enemy is prevented from attaining his object.

4. The principal weakness and danger of the defence is that freedom of action and manœuvre is temporarily surrendered and allowed to pass to the enemy, who can choose the time and place of his attack, or may be able to avoid and outflank the position chosen and prepared by the defender. Active reconnaissance is therefore of great importance, and as large a proportion as possible of the defending force should be held in hand until the enemy's line of advance has been ascertained. The security of his flanks must always be one of the most anxious considerations of the defender.

5. In the end, the strength of the defence lies, as in all forms of fighting, in the spirit, skill and endurance of the troops. The defence lacks the stimulus of forward movement and the feeling of superiority which inspires attack, and it therefore demands a high degree of discipline and of fortitude. Troops allotted to the defence of a locality must defend it to the end without a thought of withdrawal, whatever may happen on their right or left, unless and until their commander receives definite orders to retire.

6. A special feature of the defence imposed by modern weapons is that it should be in some depth. The power of modern weapons is such that the attacker, by concentrating his fire, can almost always make a breach on a limited front and to a limited depth in even an organized and prepared defence. His success can be localized and prevented from developing into a decisive break-through by the organization of the defence, so that, when the attack has spent its initial force, it will still be confronted by a prepared resistance, which will halt it and give the defender time to take counter-measures. The considerations which determine the depth to which a defensive position should be prepared in varying circumstances are discussed in Secs. **68**, 3 and **69**, 5.

68. Choice of a defensive position

1. When a commander of any grade is at liberty to choose the position on which he will await the enemy's attack, his choice will be guided by the considerations set forth below, which are of general application, whatever the size of the force.

2. He must first consider well his object, which may be to cover some particular area or feature of strategical or tactical importance, e.g. a railway, a town, a road junction, a river crossing; he must arrange to fight his battle at a sufficient distance in front of the locality which he has to cover as to ensure its security for the purposes for which it is required, and to give himself any space which he considers necessary for manœuvre. If he has no particular feature to secure, e.g. if his mission is merely to gain time, or if he wishes to induce the enemy to attack him on ground suitable for a counter-offensive, he will choose the ground which will best suit his purpose.

He must also advise himself of the time for which it is likely that he will have to hold the position, since this will influence the selection of the position and the depth to which it is organized.

3. The position must be chosen to suit the size of the force, having regard to the security of the flanks and to the depth which is considered necessary in view of the armament and tactics of the enemy and the time for which the position is to be held. This demands a well-balanced judgment; if the force is too widely extended in seeking security for the flanks, it will lack depth and may be easily broken; on the other hand, a force disposed in great depth with weak flanks may be driven or manœuvred out of position by a flank attack. The armament of the enemy must be borne in mind; for instance, an anti-tank obstacle may be of great importance if the enemy is strong in armoured fighting vehicles.

Having determined approximately the area in which his force must be disposed in order to fulfil its mission and the frontage which it will cover, the defender must next consider the factors given in the succeeding paragraphs.

4. In forces of all arms the question of observation for the artillery (and to a lesser degree, for the machine guns) must have a considerable influence on the selection of a position, since it is essential, if the artillery is to exercise its full power, that it should be possible to observe the enemy's preparations and the ground over which he must advance during the earlier stages of the attack. This will usually mean that the line of the foremost defences must be at least sufficiently far in advance of the localities selected for artillery observation to ensure that these localities are not captured and the defence blinded as the result of a local success by the enemy.

On the other hand, for the infantry of the defence concealment is the primary consideration, both in order to surprise the enemy and to avoid his fire. The two requirements—observation for the artillery and concealment for the infantry—will often be conflicting, since protection of the high ground required for artillery observation may entail the infantry holding exposed positions on the forward slope. The ideal is that minor slopes and accidents of the ground should protect the infantry, while commanding ground in rear or to the flank gives the necessary observation. If such conditions do not obtain, the commander concerned must face the problem and decide to which of the considerations—good observation or good concealment—he attaches the most importance in view of his general plan of battle.

5. When the enemy possesses tanks, the question of defence against tanks will always require attention and may be the principal consideration in the plan of defence. Full advantage should be taken of natural obstacles, and mines or artificial obstacles may be used to economize anti-tank weapons. The plan of anti-tank defence should be co-ordinated by higher commanders in the area for which they are responsible (*see* Sec. **39**). It may sometimes be necessary to site a proportion of the field guns with the primary object of dealing with enemy tank attacks.

6. The suitability of the rearward part of the position must be considered equally with the facilities for the forward defences. Ground should be sought giving good artillery positions, ample room for free and concealed movement of local and other reserves (especial regard being paid to armoured fighting vehicles, if available) and ease of supply to the troops engaged.

7. Few positions are without certain more or less pronounced salients. Salients are valuable in that they enable enfilade fire to be brought against any enemy attacking the front of the position to right and left; for this same reason they are likely to receive special attention from the enemy's fire, which can the more easily be concentrated on them by reason of their prominence. Salients therefore usually require special measures of defence, as being more exposed; they can be flanked by fire from other parts of the position. Similar considerations apply in a greater degree to advanced posts in front of the main position; such posts may be useful in breaking up the attack, but are themselves likely to be

exposed to concentrated fire and heavy attack. Advanced posts should not usually be held unless they can be well supported by fire from the main position.

8. Woods and villages will often prove important factors in a defensive position. They provide valuable natural cover, give protection against tanks, and form obstacles which break up the attack. On the other hand, they are sure to be targets for the hostile artillery fire; small woods and small poorly built villages may attract heavier fire than is compensated for by the cover which they provide; and it may sometimes be better to leave them unoccupied, covering their approaches and exits by fire and bombarding them with artillery if the enemy occupies them.

Large woods and strongly built villages may be systematically organized for defence. The forward edge, towards the enemy, is likely to be subjected to heavy bombardment, and it is often better to hold a position either in advance of the wood or village, or well inside. Within the interior the defence should be organized to command the principal rides and clearings, or streets and squares. Defence may also be prepared in rear, to command the exits.

Further details on fighting in woods and villages will be found in Infantry Training.

69. Organization of a defensive position

1. When a superior commander has chosen a defensive position in accordance with the principles given in Sec. **68**, he will make his decision clear to his subordinate commanders by defining the ground—giving a general line or naming particular tactical features—which is essential to his plan of defence; that is, the ground which his subordinate commanders must fully secure by their dispositions and must be prepared to recapture if lost: they will then make their dispositions accordingly. The superior commander must also define the front for which each of his subordinates is responsible and the area allotted to him, giving boundaries as laid down in para. 2, below. He will also usually find it advisable to indicate generally the foremost localities to be held by the defence; or at least the points of junction of adjacent units or formations in the forward line, so as to ensure proper co-ordination between the various sectors of the defence.

2. For purposes of control and command, a defensive position will be divided into sectors, to each of which a definite body of troops will be assigned. Dividing lines between sectors will be indicated by easily recognizable features and will be carried from the most forward point of the defences back to the rear of the position, the body of troops which holds each sector being distributed in depth and providing its own local reserves; it is often desirable to carry the dividing lines forward of the defences in order to define responsibility for patrolling or for some other reason. Important tactical features or likely lines of advance for the enemy should be included wholly in one sector.

3. A plan of defence should be made in terms of fire rather than of men—the co-ordinated fire of all weapons, artillery, machine guns, light machine guns, rifles and, if attack by armoured fighting vehicles is likely, anti-tank guns. Which of the above weapons should receive prior consideration must depend on the occasion. It may sometimes be the anti-tank gun and artillery sited for anti-tank defence. Against infantry, concealed machine guns are the real backbone of the defence; they require good observation and a good field of fire, but across the front of the position rather than directly forward, since machine guns are most effective when using enfilade fire. Good observation is an important requirement of the artillery (Sec. **68**, 4). For the rifles and light machine guns of infantry a long field of fire is of less importance; for good infantry, if concealed from enemy ground observation and covered by an obstacle, a field of fire of 100 to 150 yards will suffice. The defender must always bear in mind in making his defensive arrangements the probability that the attacker will make considerable use of smoke to conceal his movements and to blind the observation of the defence (Sec. **9**, 1).

4. The foremost position will consist of a belt of defended localities with intervals between them, arranged in depth and affording each other mutual support. The size of each defended locality, the garrison allotted to it and the intervals between localities will depend on the lie of the ground, especially on the facilities it offers for flanking fire by machine guns and light machine guns; the tactical situation, e.g. the length of time the position is likely to be held; and, to some extent, the training and morale of the troops. If the position has to be held by night, the danger of enemy penetration

during the hours of darkness into the intervals between localities must be taken into consideration (*see* Sec. **73**); this factor will influence the frontage allotted to a unit in defence. Similar considerations apply in the event of fog or thick mist.

5. The belt of foremost defended localities, when finally determined, becomes the front edge of the defended system, and the defence is built up in depth in rear of it. The depth to which a defensive position will be organized will depend mainly on the length of time for which it is to be held, on the configuration of the ground and on the size of the force available for defence. The position need not be organized in the same depth throughout. The greater the depth, the less will penetration on narrow frontages create serious disorganization and the greater will be the enemy's difficulties in maintaining the impetus of his attack; on the other hand, to leave the foremost defended localities weakly held simply in order to obtain depth may result in a strong natural position being unnecessarily lost. The longer a position is held and the more time the attacker takes for preparation, the more important does depth become. It will often be advisable to form a strong forward defence at the beginning and to reduce the garrisons of the foremost localities as the defences are improved and the enemy preparations make depth of more importance. Eventually, when the stage of position warfare is reached (Chapter IX), the foremost defences may become a lightly held outpost line, while the depth of the main defensive system should be such that the enemy will be unable to attack the rear portions of the system without moving his guns forward.

6. Local reserves must be ready either to occupy a position to check enemy penetration or to deliver immediate counter-attacks (Sec. **70**, 3). They should prepare, or at all events reconnoitre, a position for the former role; whether or not they should occupy it until required for counter-attack will depend on the size of the reserve and on the situation: smaller reserves, up to and including an infantry company, should normally occupy the allotted position, until required for counter-attack. Lines for counter-attack on the more important tactical features should be reconnoitred and the method of retaking them planned.

7. Defended positions will always be strengthened by entrenchments and obstacles to the fullest extent that the

time available permits. Details of the construction of defences will be found in the Manual of Field Engineering, Vol. I (All Arms). Concealment from the air is of importance and use should be made, when time permits, of camouflage devices; dummy trenches may usefully be constructed. A programme of work should always be drawn up, showing the sequence in which work will be carried out as time permits (Manual of Field Engineering, Volume I (All Arms), 1933, Chapter V).

8. The reconnaissance and occupation of a defensive position will be carried out on similar lines to preparation for attack (Sec. **56**). There will be times when a force or part of it is thrown on the defensive unexpectedly with little or no opportunity to select or prepare a position beforehand; it must then occupy the best position it can in accordance with the principles laid down in this chapter. It may sometimes be advisable to carry out a withdrawal, in order to obtain a more favourable position for defence.

9. Outposts are always required to cover the occupation and preparation of a defensive position. Their strength and the degree of resistance to be offered by them will vary in accordance with the plan of the commander and the distance apart of the opposing forces. They may have to resist and break up the enemy's attack to the limit of their power, or may be withdrawn as soon as it seems probable that an attack is imminent. Definite orders as to their role must be issued by the commander concerned. The use of outposts to delay and break up an attack is further discussed in Field Service Regulations, Volume III, 1935, Chapter VI.

70. Conduct of the defence

1. The defender must endeavour by all available means to discover the enemy's intentions and the time and place of his attack. Active and constant patrolling should be carried out, and the indications of attack—such as the appearance of reconnaissance parties, movements of troops, registration by artillery—should be carefully watched for and reported. If the enemy's intentions can be discovered or deduced, effective counter-preparation by the artillery (Sec. **5**, 6) and machine guns may be carried out.

2. The fire plan in defence has generally to concern itself with three stages: interference with the enemy's preliminary

preparations for the attack and his advance to and assembly in forming-up positions, fire to repulse the enemy's tanks or infantry when the actual assault is delivered and fire to check any hostile penetration or to support counter-attack.

The first stage is mainly in the province of the artillery (harassing fire and counter-preparation); machine guns sited for long-range fire, and troops in outpost positions or advanced posts, may assist to delay or prevent the assault. In the second stage, the defender depends on the prepared belt of co-ordinated fire in front of the foremost defended localities to defeat the assault, the artillery being responsible for defensive fire (Sec. **74,** 5) and for counter-battery work. Once any body of the enemy has passed this belt of fire, the artillery can usually fire on it only by direct observation or in support of an arranged counter-attack; to check its further penetration is the business of the infantry weapons sited for defence in depth and of the local reserves; the artillery meanwhile will endeavour to prevent the advance of the hostile reserves.

3. If portions of the attacking force succeed in penetrating the defender's position, the nearest commander with reserves at his disposal is faced with the problem of whether to use those reserves defensively, to check and localize the enemy's success, or offensively, to counter-attack the enemy. The decision is often a difficult one to make and cannot be subject to rules. To counter-attack as a matter of routine (or as a supposed matter of honour) whenever ground is lost, is simply to court unnecessary and useless casualties; counter-attacks should be made only with a definite and useful object, e.g. to recover ground or to close a gap, when the system of defence in that part of the field is in peril, or to exploit an opportunity of dealing the attacker a blow with a good prospect of success. Surprise, which is the principal weapon of the attacker, is also the chief factor in the success of the counter-attack.

Counter-attacks are classed as immediate or deliberate, according to their purpose and method of delivery.

The immediate counter-attack has as its object to check the enemy and to stabilize the situation in that particular part of the field. If these purposes are accomplished, it is not material whether or not the position originally held by the defence is recaptured. It should be launched during the period of temporary confusion and disorganization which occurs when the attacking troops have penetrated the position

and gained an objective, but have not had time to settle down or to become familiar with their new surroundings. This period, with good troops, is very short; so that the immediate counter-attack must be delivered without delay on the initiative of the local commander. It will have only the fire support instantly available—pre-arranged, if possible—will have only a limited objective (to drive the enemy from some tactical feature which he has captured) and will, whenever possible, have been reconnoitred and planned beforehand. In these conditions, if boldly and rapidly made—from an unexpected direction, if possible—it will often have an easy success and will re-establish the local situation. Troops in reserve should study carefully any ground over which they may be ordered to counter-attack.

Once the enemy has been given time to settle down, to reorganize and to place machine guns and anti-tank guns in position to defend the ground which he has gained, the moment for the immediate counter-attack has passed. To attack now without preparation and without adequate fire support is wasteful and ineffective. The counter-stroke must now be deliberate, that is to say, it must be carefully planned and supported by adequate fire power. The actual time taken to prepare it must depend on circumstances; it may be an hour or two or a day or two; it will usually be advisable, if possible, first to check the enemy and stabilize the situation, so as to have a firm base from which to launch the counter-attack. But the quicker it can be organized, the less time the enemy is given, the greater the chances of success; to wait for a more favourable moment may spell the loss of opportunity altogether. The considerations are in fact much the same as in making an attack (Secs. **55,** 6, and **56**); and, as in attack, surprise (i.e. variation in method, in time, in procedure) will be a principal factor. An attack launched from the shoulders of the salient formed by the enemy penetration will often be most effective.

4. Whether or not a counter-attack is to be made, the success of an enemy who has succeeded in penetrating the position should be as far as possible confined by holding the flanks on each side of the gap, and thus forcing the enemy into as narrow a salient as possible.

5. Considerations regarding the counter-offensive, i.e. a change from defence to attack on the part of the higher commander, will be found in Field Service Regulations, Volume III, 1935, Chapter VI.

6. In mobile warfare, the use of gas by the enemy in the form of cloud or projector attacks, or of shelling by artillery, will be restricted by the time required to bring up the apparatus or ammunition; the use of gas in these forms belongs rather to position warfare (Sec. **91**). Attacks on a position by gas spray from the air may be expected during the period of the enemy's advance towards the position. Once the two forces are in close contact, the difficulty of ensuring that his own troops are not affected may restrict the use of gas spray by the enemy, so far as forward positions are concerned.

7. The principles of the use of aircraft in the defence are similar to those in the attack (*see* Sec. **66**). Efforts will be made to prevent the enemy obtaining air superiority and hampering the work of the army co-operation squadrons, while bomber squadrons may be used to attack enemy troops and transport. Reconnaissance will be directed especially to detect any hostile movement against the flanks and the advance of any fresh columns.

71. Armoured units in the defence

1. Tanks are essentially weapons of offence; and armoured units will normally be held in reserve for the counter-attack (especially of the enemy's armoured fighting vehicles) or counter-offensive. The requirements of concealment and of protection from shell fire will usually necessitate tanks being kept well back from the front; but there may occasionally be ground which offers protection and concealment for tanks in close proximity to the forward defences; if there is, tanks may be used effectively in the immediate counter-attack and may be able to inflict heavy casualties on the enemy.

2. If tanks are to be the weapon chiefly relied on for the counter-stroke or counter-offensive, the ground must be chosen and the fire plan arranged to suit their characteristics (Sec. **60**).

72. Mounted troops in the defence

1. Mounted troops may usefully be employed in covering the occupation of a defensive position, in reconnoitring the enemy's approach, in delaying his advance and in concealing the exact situation and strength of the position. As the

opposing forces gain close contact, the mounted troops may be employed for protection of the flanks, for reconnaissance (e.g. of enemy reinforcements approaching) or as a mobile reserve. Their mobility gives them a special value for reaching rapidly areas to which the enemy has penetrated, and for closing gaps by their fire power. They will co-operate in the counter-offensive and will act as laid down in Sec. **61**. The concealment of mounted troops, especially from the air, is of importance.

2. As regards mounted troops in a withdrawal, *see* Field Service Regulations, Volume III, 1935, Chapter VII.

73. Infantry in the defence

1. The fire power of infantry is the real backbone of the defence; its effectiveness depends largely on concealment and surprise. In taking up a defensive position with infantry, the siting of the machine guns, of the mortars, of the anti-tank guns and of the defended localities held by the riflemen will all require consideration.

2. The machine guns, the most powerful weapon of the defence, should, whenever time permits, be considered first. They should be organized in depth, the proportion used for forward defence and the proportion kept for rear defence being determined by the considerations given in Sec. **69**, 5. They should be sited so as to sweep with enfilade or oblique fire the probable lines of enemy approach and so as to provide as nearly as possible a continuous belt of fire across the front of the position. Concealment is of the utmost importance; they should usually be placed behind some feature giving concealment from the front. Thus they will not necessarily be sited in the area of the unit whose front they are covering; nor will they usually cover by fire the ground immediately in front of them, so that they must be protected by the dispositions of the riflemen in the defended localities.

Attacks are likely to be made under cover of darkness or the concealment of smoke, when observation of enemy movement is impossible. Machine guns can still maintain accurate fire on fixed lines in these conditions, provided that preparations have been made in daylight. When a position is to be taken up by machine guns, arrangements must always be made to allow sufficient daylight for these preparations, which require a minimum of about one hour.

The plan of artillery fire and machine-gun fire should be

co-ordinated (Sec. **74**, 1). Machine guns may be used for counter-preparation or harassing fire.

3. The defended localities to be held by the riflemen will be selected in conjunction with the machine gun tasks and positions. They should comprise a number of section posts, arranged so as to afford one another mutual support and to be under easy control of the platoon commander; they may vary in size from a platoon to a company locality. They will protect by their dispositions the sites chosen for the machine guns, which may be included within the localities; the fire of the light machine guns and rifles will be co-ordinated with the fire plan of the artillery and machine guns, so that there is a continuous belt of fire along the front of the position—the light machine guns and rifles usually filling up the gaps in the machine-gun belt. In making these dispositions, it must be remembered that riflemen, when attacked, tend to fire straight to their front, and cannot be relied on for enfilade fire.

4. Mortars may be used in the defence as a reserve of fire power, especially to support counter-attacks; and may also on occasions be included in the fire plan of the defence, to deal with some part of the front which is not adequately covered by the artillery or small-arms fire. The difficulty of ammunition supply to the mortars is less in defence than in attack, and their capacity for rapid fire can be more fully exploited. They will usually be dug in singly, according to the task which they have to perform; but they may also be used in pairs. Mortars which have been dug in and registered can fire on fixed targets if observation is impossible by reason of darkness or smoke.

5. Infantry anti-tank weapons will be sited to cover the most likely tank approaches and will be carefully concealed. Their action will be co-ordinated with that of other weapons (Sec. **68**, 5).

6. Infantry is responsible for siting, organizing and constructing its own defence works, including wire entanglements. Engineer advice and assistance will sometimes be available (Sec. **75**). Good preparation and organization of work on a definite plan are essential to obtain good results. Details will be found in the Manual of Field Engineering, Volume I (All Arms). Obstacles should always be designed with the object of forcing the enemy into the arc of fire of the machine guns or anti-tank guns.

7. Infantry patrolling in the defence should be constant and should be directed especially towards detecting any movements or indications of impending attack. By night, patrolling in the gaps between the defended localities will be important (Sec. **69**, 4). Details of infantry patrol work will be found in Infantry Training.

74. Artillery in the defence

1. The tasks of artillery in the defence have been outlined in Sec. **5**, **6**. Its chief business is to cause the greatest possible loss and disorganization to the enemy before they reach the front defences. Batteries will be disposed primarily with a view to producing the maximum fire for counter-preparation and for the defence of the foremost defended localities. This fire should be co-ordinated with the fire of the infantry; special arrangements may be made, for example, to search ground which is dead to the machine guns and rifles of the defence; or to fire so heavily on certain lines of approach as to induce the enemy to take others which, in combination with skilfully placed obstacles, will lead them into zones where the machine-gun fire of the defence has been specially planned to deal with them.

2. The artillery should be distributed in depth, in order to minimize the effect of the enemy's counter-battery fire and to ensure that the mass of the artillery will not be overrun by the first rush of an attack. Except for guns placed forward for harassing fire and counter-battery work, the most advanced field batteries should be far enough back to enable them to cover a wide arc and to support counter-attacks without change of position. If the enemy possesses armoured fighting vehicles, the requirements of anti-tank defence will usually be a primary consideration. In addition to the normal procedure of artillery providing for their own mutual support against tank attack in their ordinary positions, it may be necessary to site a proportion of field guns for the defence of the forward troops against tanks (Sec. **68**, 5).

Concealment is of importance, in order to secure surprise and to avoid the counter-battery fire of the attacker. Since with existing means of locating batteries an active battery cannot escape detection for long, as many batteries as possible should occupy silent positions, from which they will fire only in counter-preparation and in repulsing an attack. Alternative positions should be chosen for guns which are active

before the attack. The artillery fire plan should not be prematurely disclosed (*see* para. 5, below).

3. Survey work, the selection of observation areas and arrangements for intercommunication all require attention in artillery preparation for defence. The longer time usually at their disposal for survey work will give the defence the advantage of being better prepared than the attackers to carry out predicted shooting (*see* Sec. **5,** 6); the value of this is that it gives a considerable power of surprise; no guns need fire from their selected positions, until required for counter-preparation or defensive fire; it is also important, since the enemy is likely to try to blind the defenders' observation by the use of smoke. For this latter reason alternative areas for observation should be selected and manned, when possible. Good intercommunication is essential (*see* Sec. **76,** 1).

4. Counter-battery work will generally be carried out under the control of corps headquarters, if the means of intercommunication permit. Sound-ranging and flash-spotting groups will be installed and air photographs will be taken, if possible before as well as after occupation by the enemy, in order to assist in locating the hostile batteries. If the enemy carries out artillery preparation before advancing to the attack, his batteries should be engaged; if counter-preparation is ordered, the proportion of artillery to be used for counter-battery work will depend on the number of enemy batteries located and the amount of damage which they are causing; when an attack actually takes place, it may be necessary to stop counter-battery work for a time and to concentrate the whole power of the defending artillery on the assaulting troops.

Harassing fire (Sec. **5,** 6) may be carried out by sections of field artillery or single guns placed in temporary positions well forward.

5. Artillery defensive fire, to repel an assault, will be concentrated on the assaulting troops and their reserves. When possible, it will be controlled by observation; but arrangements will always be made for predicted fire to be put down on any part of the front if observation is impossible; at night, guns will be laid on certain pre-arranged lines. The fact that the enemy is actually assaulting will be notified by the infantry or by artillery observers, by means of light signals, if available. It will be confirmed by all available means of intercommunication. Care must be taken that the scheme of fire for repelling an assault is not put into operation, and thus disclosed to the enemy, merely on the threat of attack; to prevent this, it may be necessary to lay down which commander or commanders are entitled to give the signal for defensive fire. It will also be necessary to decide by whom counter-preparation may be ordered.

If the enemy has penetrated the foremost defences, the artillery should fire on them if it can be seen clearly by direct observation that the enemy has overrun some portion of the defences and that fire must be opened at once if an opportunity is not to be lost: otherwise, fire will only be brought back behind the original front with the consent of the commander of the sector affected.

6. The support of counter-attacks, immediate or deliberate, will be guided by the same principles as the support of the attack. The support of immediate counter-attacks will be on the initiative of the subordinate artillery commander on the spot; the support of deliberate counter-attacks will require more organization and control; it will be the duty of artillery commanders to point out how soon efficient artillery fire can be organized, or, if it is desired to make the attack within a certain time, how far the artillery support can be efficient by that hour.

75. Engineers in the defence

1. When a defensive position is being taken up, there is always likely to be more work on which engineers can usefully be employed than there are engineers available to carry it out. To ensure that the engineers are used to the best advantage, it is necessary that the commander concerned should give his senior engineer officer early information of the position to be taken up and of the plan of defence, so that the necessary reconnaissance may be carried out as soon as possible.

In the hasty occupation of a position it will usually be advisable in the first instance to allot engineer units to definite sectors, corresponding with those allotted to formations, such as brigades. Until a definite programme of engineer work can be laid down, the engineers may be required to assist the other arms in strengthening their defences. As the defence develops and the engineering requirements are known, the engineers will be employed on a definite programme of works.

2. The following are types of work on which engineers may be employed:

i. Obstacles or clearances, requiring the use of explosives or special engineer tools; anti-tank obstacles.
ii. The construction of observation posts or machine-gun emplacements requiring technical skill.
iii. Shelters or dug-outs for headquarters.
iv. The improvement of communications.
v. Water supply.

3. When working with other arms, engineers are responsible for the technical correctness of the design, for the supply of material, stores and additional tools and for giving an estimate of the time required to complete the task. When working parties of other arms are detailed to assist engineers, the senior officer on the spot will be responsible for the execution of the work in accordance with the orders and the design for it; and will decide, if the working parties seem likely to incur heavy casualties, whether they are to be withdrawn or whether the work is to be carried out at all costs. If it is obvious beforehand that the nature of the work is such that casualties are likely to be incurred, the commander who orders the working party should give an indication of the importance which he attaches to the completion of the work.

4. Engineer units may be regarded as a reserve of fighting men, but will be used to fight only in an emergency, as a last resource. If employed to fight, an engineer unit should be kept intact as far as possible and allotted a definite task, such as the defence of a certain locality, the protection of a flank or, in very exceptional circumstances, the delivery of a counter-attack. Engineers so used should be relieved by other troops as soon as possible, so that they may resume their normal work.

76. Signals in the defence

1. Intercommunication is a factor in which the defence, being stationary, should have an advantage over the attack, if good use is made of the time available for preparation. After providing for the general system of command, an early and important care of the signals should be to arrange for artillery requirements, so that the fire of the artillery can be controlled and concentrated with the greatest possible flexibility. The sooner, therefore, that the lay-out of the

artillery and the positions of headquarters can be settled, the easier for the signals. Artillery headquarters should, so far as possible, be in the same place as the headquarters of the infantry which they are supporting. Both cable and wireless should be provided, when possible.

2. As time permits, the signal system will be improved by the organization of alternative methods (e.g. the establishment of visual stations under cover, the marking of routes for orderlies) and by the protection of cable from damage by traffic or shell fire, by burying or by other means.

3. When a proportion of the force is held in reserve for a counter-offensive, a suitable proportion of signals should be held in reserve for it.

CHAPTER VIII

NIGHT OPERATIONS

77. General considerations

1. The influence of the air arm, in its increased numbers, its wide scope and range of reconnaissance and its power of attack, has greatly enhanced the importance of movement by night; it is, indeed, difficult by day for a force of any size to outmanœuvre and surprise an enemy who possesses aircraft, unless the weather prevents air observation. Night marches will therefore be frequently undertaken by all arms (*see* Sec. **32**, 2, as regards the capacity of aeroplanes for night reconnaissance). The great fire power of armies has also increased the frequency of night operations in close contact with the enemy (night attacks, night advances or withdrawals), which are carried out to avoid hostile observation and aimed fire and to surprise the enemy.

Night operations have serious drawbacks and dangers; the difficulties of control by officers and non-commissioned officers are much increased; there is a liability to misdirection, confusion and even panic; the physical condition of troops is apt to be impaired by loss of sleep. But these dangers can be much lessened or overcome by discipline, training and careful preparation: an army which by practice has acquired skill and confidence in work by night will hold a great advantage over less well trained enemies and will often gain the moral and material benefits of a successful surprise. Further, the expectation of night advances will force the enemy to hold his front more strongly and will thus lessen the extent of front which he can hold with a given force (*see* Sec. **69**, 4).

2. Apart from the discipline and training of the troops, the chief requirements for success in night operations are that the plan should be simple and that the reconnaissance and preparation should be as thorough as possible. Reconnaissance of the route or ground over which the operation is

to be carried out should be made by night as well as by day, whenever possible, and by as many of the commanders concerned as is practicable. Preparations include: the most careful calculations of time and space, checked over the actual ground, if possible; precautions against the danger of loss of direction (e.g. marking of the route, taking of compass bearings); plans for the removal or crossing of obstacles; provisions for distinguishing friend from foe (badge or password); organization of means of intercommunication; devices for maintaining silence and secrecy and for deceiving the enemy; arrangements for the rest and feeding of the troops; details of the equipment to be carried; and any other measures that prudence, forethought and ingenuity may suggest. It is important that troops embarking on a night operation should be rested as much as possible and given a meal before starting. The thoroughness and care with which a night operation should be planned should be limited only by the time available. Secrecy is important, since failure to achieve surprise may neutralize the most careful preparation; but all troops taking part must fully understand their roles in the operation.

3. Night operations may be divided into:—

i. *Night marches*, i.e. movements in normal march formation; the force may either be responsible for its own protection or may move behind the protection of other troops;

ii. *Night advances* (or withdrawals), i.e. movements made in some battle formation, in proximity to the enemy;

iii. *Night attacks*, i.e. attacks delivered in darkness, either by troops already in position, or after a night advance or night march.

Attacks at dawn are not included in the term night operations; but the approach, assembly and other preparations, which will usually be made under cover of darkness, will be governed by the rules for night operations; these are applicable also in many respects to operations in thick fog or mist.

4. If a night advance is the sequel to a night march, a point known as the *assembly position* must be selected beforehand; at which point the normal march formation will be abandoned and a battle formation adopted.

If a night attack is to follow a night advance, a *forming-up place* will be chosen; where the troops detailed for the assault will deploy from the formation in which they have made the advance into the formation in which they will assault.

Thus, if a night attack is to be initiated at a distance from the enemy, the sequence may be: a night march to a position of assembly; thence a night advance to a forming-up place, where final deployment for the assault takes place.

5. Although night operations against savage enemies, who are accustomed to movement in the dark, may entail some risk and may sacrifice the advantages of a superior armament, they have, if well planned and executed, a great moral effect on some uncivilized enemies (Sec. **94**, 4).

78. Night marches

1. The route for a night march should, when possible, be reconnoitred both by day and night. Branch roads or other places where the column might go astray, and points where checks are likely to occur, will be noted and clearly marked, as will also the starting point for the column. If the march is to be made across country, the route will be fixed by compass bearings. Landmarks which are visible by night will be noted and the distance between those that lie on the line of advance will be measured, so that the progress of the march may be checked. It is advisable to detail an officer in the column to check the distance marched and the progress of the column with reference to the landmarks which have been noted. Where the country is featureless, it may be necessary to post men at certain points along the route, particularly at places where a change of direction has to be made; they will be given the compass bearing and the distance to the next post.

2. It is best to retain the regulation distances between units, in order to prevent constant checks throughout the column; but they may on very dark nights be reduced or omitted. An officer will invariably march in rear of each unit. Touch should be maintained throughout the column, connecting files being used as necessary. The times and periods of halts will be arranged before starting; no unit will halt until it has regained any distance that it may have lost. During halts men may lie down, but must not leave the ranks; mounted men will retain hold of their horses. Every commander must have a fixed place in the column where he should remain. Liaison personnel should be used to convey instructions from headquarters to subordinate commanders.

3. It is not safe to calculate on a large force averaging more than two miles an hour; the darker the night, the slower will be the pace.

4. The above instructions apply generally to all marches by night, whether or not the column is protected by the dispositions of other troops. If it is not, and there is any possibility of the enemy being encountered, advanced, flank and rear guards will be detailed. These protective bodies will normally consist, except in columns of mobile troops, of infantry only. Their size and their distance from the column will vary according to the ground and to the darkness of the night. They need usually only to be large enough and at a sufficient distance to prevent small bodies of hostile troops from interfering with the march; if the enemy is likely to be met in any strength, movements should not be undertaken in column of route, from which it is difficult to deploy quickly in the dark without confusion. In enclosed country, the flanks are best protected by posts placed in position by the advanced guard and withdrawn by the rear guard; in open country, flanking patrols may sometimes be used instead of stationary posts, but they are liable to lose direction unless accustomed to night work.

The advanced guard will usually be responsible for blocking all branch roads which are not to be used, either by posting men or by placing some pre-arranged block across them (e.g. a line of stones or the branches of trees); if men are posted, they will be withdrawn by the rear guard.

If obstacles are likely to be encountered, a party of engineers with the necessary tools should accompany the advanced guard. After crossing an obstacle or defile, where opening out is likely to occur, the column will advance about its own length and then halt until the rear has closed up.

Mounted troops and artillery should be given the least exposed places in the column. No more transport should accompany the column than is absolutely essential.

5. If the march is being made to an assembly position as a prelude to a night advance or night attack, this position must be carefully reconnoitred and must be so selected (at or near some well defined natural feature) or so marked as to

be unmistakable at night. It should be secured by advanced troops in good time beforehand.

6. All ranks must be informed what their action is to be in the event of alarm or attack, or of an aeroplane dropping a flare. Rifles will not be loaded, but magazines will be charged: no firing will take place without orders. Absolute silence will be maintained, and no smoking, striking of lights or use of electric torches will be allowed, except by permission of the commander of the force.

79. Night movement by mechanical vehicles

1. Armoured fighting vehicles are not suited for fighting at night, except in specially favourable conditions (e.g. by moonlight), since without headlights their field of vision is very limited and the noise of their movement betrays their approach and makes surprise unlikely. Armoured units will, however, frequently carry out moves at night as a preliminary to an attack at dawn, to gain a position of concealment before daylight, or for any other purpose. They will observe the rules laid down in Sec. **78**, as far as applicable. They will usually move in an area protected by other troops: if they have to provide their own protection, they will do so on the same general principles as other troops (Sec. **78, 4**), light tanks or armoured cars being most suitable for advanced and flank protection. Special reconnaissance of the route will be required to ascertain its suitability for the type of armoured vehicle using it. Orders as to the use of lights must be issued; the pace of armoured fighting vehicles with and without lights is given in Appendix I.

2. Mechanical transport can move at night without headlights, at a slow pace; but sidelights and tail lights are almost always essential. In order to ensure a column taking the correct route, lighted signs may be placed at certain points or men posted. Motor cyclists are valuable for traffic control and for intercommunication.

80. Night advances

1. A night advance, i.e. a forward move in battle formation, is undertaken when it is desired to gain ground under cover of darkness, and the enemy is too close for the movement to be safely made in march formation. A night advance may follow a night march, and may be the preliminary to a night attack or to an attack at dawn.

2. When a night advance follows a night march, the choice of a suitable assembly position (Sec. **77**, 4) is of great importance. It must be clearly recognizable (Sec. **78, 5**), should, if possible, afford cover to the troops and should enable deployment into open formation to be made quietly and without confusion; points such as important cross-roads, which are likely to be registered by the hostile artillery, should be avoided. The deployment must always be made under cover of protective detachments.

The distance of the assembly position from the objective will depend mainly on the nature of the country and on the size and composition of the force; other factors such as the vigilance of the enemy and the state of the moon or of the weather (for instance, a hard frost making movement audible at a greater distance than usual) will also have to be taken into account. Very generally, it will not usually be safe to continue in march formation within about 2,000 yards of a vigilant enemy.

Any mounted troops, artillery or transport that have accompanied the column up to the assembly position will usually be left there, the further advance being made by infantry alone, the troops most capable of movement and action at night in the presence of the enemy.

3. As thorough a reconnaissance as possible will be made of the ground over which the advance is to take place; in particular, note should be taken of the existence of any obstacles (such as a wire fence) for the removal or passage of which special measures may be required. Aeroplane photographs, verticals or obliques, will often be of great value. Compass bearings should be taken and notified to all concerned. The instructions laid down in Sec. **78, 6**, regarding the loading of rifles, smoking, silence, showing lights, etc., apply equally to night advances.

4. The formations suitable for night advances are dealt with in Infantry Training. The advance should be preceded by strong protective patrols under officers whose duties will be ground reconnaissance, local protection and action against enemy patrols or outlying piquets; these should be rushed in silence with the bayonet without hesitation.

The forward troops of the main body will be in the formation which allows of the maximum control combined with rapidity of deployment; a line or lines of small columns will usually be suitable. It is advisable that there should be

local reserves behind the flanks of the forward troops; they will then be well placed to envelop the enemy's flank or to deal with a counter-attack from the flank. The reserve, with which may be machine guns and engineers for consolidation, may be in any formation suitable for movement and control. Connecting files to maintain touch from front to rear and laterally should be freely used. The frontage covered by a battalion in a night advance will be less than by day, and will not normally exceed about 600 yards.

The commander of the force should be well forward so that he can exercise control in the event of some unforeseen obstacle or development.

5. If there are obstacles, known or suspected, to be cleared away, small parties of engineers may be detailed to accompany the forward troops. If there is delay in removing obstacles, the troops will lie down till a passage is cleared. All ranks must clearly understand what their action is to be should the enemy open fire before the objective (or forming-up place) is reached. Unless other orders are issued, the advance will be continued steadily in the same formation and at the same pace.

6. The rate of advance will depend on the ground and on the darkness of the night. It is not usually safe to count on troops in deployed formation moving in the dark faster than 100 yards in three minutes or about one mile an hour.

81. Night withdrawals

1. When in close contact with the enemy, a withdrawal, if necessary, can more easily be effected at night, but proper preparations must be made and precautions taken to avoid confusion. The enemy, owing to the dangers of operating at night without preparation and reconnaissance, will find difficulty in organizing a pursuit at short notice and is likely to follow with caution or to await daylight before pursuing. On the other hand, if he discovers the withdrawal, he may cause considerable loss and confusion by concentrating his artillery and machine guns on the lines of withdrawal; so that secrecy is of great importance and every means should be used to conceal retirement. Normal activity should be maintained as long as possible by the forward troops and artillery, and fighting patrols should be sent out to drive off the enemy's patrols or keep them at a distance.

2. Withdrawals at night will be carried out on the same general principles as by day (Sec. 48), and with the same precautions as regards previous reconnaissance, careful preparation (marking of routes, etc.), silence, avoidance of unnecessary lights, and so forth, as in other night operations. A carefully worked out and strictly observed time-table is the basis of a well-organized withdrawal.

82. Night attacks

1. Night attacks have the advantages of avoiding the aimed fire of the enemy (except of machine guns laid on fixed lines), of surprise (if proper preparations have been made and precautions taken) and of moral effect, especially against less well-trained troops. At night, in fact, superiority in discipline and in training has even better opportunity to exploit its full value than by daylight.

The objectives of night attacks must be strictly limited both as to frontage and as to depth; even the most highly trained troops cannot safely manœuvre in darkness or exploit a success beyond a certain point. Hence night attacks should usually be directed against well-defined objectives limited in size, such as an enemy advanced post or a salient or detached feature in the enemy's position. If a portion of the enemy's main line is to be carried at night, care must be taken that it will not be overlooked from the flanks and enfiladed at dawn. Other suitable occasions of night attacks may be to regain by counter-attack a position which has been previously lost—the attackers will have the advantage of familiarity with the ground—or to carry an enemy outpost position as a preliminary to attack on the main line by daylight.

Night attacks are usually executed by infantry, with or without the assistance of artillery and engineers. Only exceptionally favourable circumstances will justify attacks in the dark by armoured fighting vehicles or by mounted troops.

2. The smaller the force, the less likelihood of confusion; a brigade of infantry is the largest force that can be used against one objective without risk of serious mischance; if it is desired to attack on a larger front, it is usually advisable that two or more distinct operations should be carried out—each with its own objective: the attacks may be timed to be simultaneous but should be executed independently of each other.

Night attacks which require a preliminary night march to approach the enemy run a greater risk of premature discovery, if the enemy is vigilant, or of some mishap or mistake. On the other hand, if the enemy is not vigilant or can be deceived, a complete surprise may be effected. As the risks of such an operation are great, so must the preparation be thorough.

3. Artillery can give no support to a night attack unless already in action in daylight or unless the battery positions and localities on which artillery fire is required have been fixed with sufficient accuracy for predicted shooting. If artillery is used, it may carry out a short preparation just before the assault; or may fire during or after the assault against points on the flanks of the attacking force and against probable assembly positions well beyond the objective, with the idea of preventing or hampering counter-attacks. Occasional firing by the artillery may sometimes be used to cover the noise made by the approach of the assaulting troops.

4. The timing of night attacks requires careful consideration with regard to the object of the operation. Time will usually be required to enable the position gained to be consolidated before daylight; unless it is intended to continue the operation immediately after dawn, when it may be of advantage to allow the enemy as little time as possible to recover from his surprise. If too much time is allowed for consolidation, the enemy may have time to organize a counter-attack before daylight. A favourable state of the moon may influence the hour chosen; for instance, the light of the moon may be used for the approach, the actual assault being delivered when it has gone down; or the assault may be made just before the moon rises, so as to have the advantage of its light for consolidation. It will assist troops to keep direction in the dark if their objective is on a sky-line, i.e. if they are attacking uphill.

Part of the advantages of a night attack—absence of aimed fire and surprise—may sometimes be gained by an attack at dusk, while there is still light enough for the attackers to keep direction, but not enough for the defence to direct their fire with accuracy; positions in front of which assaulting troops have been held up during daylight may sometimes thus be carried by a surprise attack at dusk.

5. The preparations for a night attack must be even more detailed than those for a night march or night advance (*see* paragraph 7, below, for the points which require consideration). The forming-up place, where the final deployment for the assault takes place, should be as near to the position to be assaulted as is consistent with avoiding detection by the enemy; if possible, it should be within 500 to 600 yards of the objective, since it is difficult to maintain direction and formation in the dark for long once the force is fully deployed; the actual distance depends on the ground, the vigilance of the enemy and the darkness of the night. The forming-up place must be easily recognizable and, if no natural landmarks exist, it may have to be marked by tapes or other means.

The formation adopted at the forming-up place will be similar to that for a night advance (Sec. **80**, 4) except that the forward troops will now be deployed; careful organization and good discipline are required to ensure that the deployment is carried out noiselessly and without confusion.

6. All ranks must understand that, once the forming-up place has been left, the assault must be carried through to the objective, whatever happens; hesitation is fatal; if the enemy opens fire before the objective is reached, the force will continue to press forward and will carry through the attack. The assault will be made in silence with the bayonet.

Consolidation will be carried out on the general principles laid down in Sec. **59**; it will be a great protection against infantry counter-attack if a wire obstacle can be put out early; if the enemy has armoured fighting vehicles, the organization of anti-tank defence is important.

7. Orders for night operations will often contain considerable detail. The following are some of the chief points with which they may have to deal:—

i. Timing of the operation; times of arrival and departure at the assembly position and forming-up place: time and place of halts; synchronization of watches.

ii. Description of the assembly position and forming-up place; their distance from objectives; compass bearings.

iii. Formations to be adopted at the assembly position and forming-up place.

iv. Action of artillery and engineers.

v. Equipment to be worn or carried by the troops; arrangements for entrenching tools.

vi. Distinctive marks and password.
vii. Description of the objectives.
viii. Any special instructions for the attack: signal for the assault.
ix. Position of commanders and arrangements for intercommunication.
x. Arrangements for consolidation.
xi. Administrative measures: ammunition, casualties, rations, water, prisoners, straggler posts, etc.

The issue with orders of a sketch plan, showing assembly position, forming-up place, prominent landmarks, etc., will often be of value.

CHAPTER IX

POSITION WARFARE

83. General characteristics

1. The following chapter deals mainly with static conditions developing gradually out of operations begun in conditions of open warfare. The tendency of some nations on the continent of Europe to construct elaborate defences along the whole length of a frontier in peace time may, however, result in static conditions obtaining from the very outset of a war. In such an event the operations will be equivalent to siege warfare (*see* para. 3, below).

2. In the open field, the number and the fire power of the machine guns and other automatic weapons of an army make the assault of even a hastily occupied position a sufficiently formidable undertaking, provided that the defender has some skill in the concealment of his dispositions, especially of his machine guns. If he has time to entrench himself—and a few hours only are required to dig cover giving a considerable degree of protection against small-arms fire and against the artillery weapons of a mobile field army—the attacker's hazards are increased, since the targets offered to his artillery and other weapons are much reduced, even if they are sometimes easier to locate, owing to the visibility of entrenchments from the air.

But it is the addition to a defensive position, either before or during a battle, of an obstacle—of barbed wire against infantry, of minefields or of specially dug works against armoured fighting vehicles—that is most likely to bring to a definite halt an offensive movement begun in the open field. Only with a considerable mass of tanks or a great weight of artillery can the attacker hope to force a position once it has been effectively entrenched and strengthened by an obstacle; and while he is collecting means and resources to resume the offensive, the defender hourly deepens his position and improves his works. Unless the position can be turned, the attacker may be driven to entrench himself opposite the enemy and to

resort to deliberate methods of warfare, the main characteristics of which this chapter is intended to outline. It contains no new principles, only the development and application to a particular problem of the principles for attack and defence already laid down in Chapters VI and VII.

3. Position warfare, which may begin with entrenchments hastily dug by both sides in the course of open fighting, may develop, as time goes on, into what is for all practical purposes siege warfare, the history and principles of which are dealt with in Military Engineering, Volume II. In this extreme form, the defensive system will extend to a depth of several thousands of yards, strengthened by concrete works and shelters, by deep dug-outs, by wide obstacles or inundations; artillery and mortars of the heaviest calibre, with an almost unlimited supply of ammunition, will be used both in attack and defence; mining and counter-mining will take place; and a huge system of depots, stores and installations of all kinds, together with a network of communications—by road, water, railway, tramline—will be required to deal with the masses of ammunition, and of the material, offensive and defensive, which this type of warfare necessitates. The control of such an organization will require a large expansion of the telegraph and telephone systems.

Between the two extremes of hasty entrenchment and regular siege process there will be several stages; varying degrees of expansion and improvement in defence will meet correspondingly intensified forms of attack. Generally speaking, what will distinguish position warfare from open warfare will be that both sides will be continuously in close contact, with little space or opportunity to manœuvre; that the depth of the defences will be limited only by the troops, time, labour and material available; and that the defences will be covered by continuous obstacles, artificial as well as natural. The problems of this type of warfare are mainly artillery and engineer problems. Armoured fighting vehicles and infantry, continually halted or hampered by obstacles and with small chance for manœuvre, are more than ever dependent on the support of the artillery, the proportion of which tends continuously to increase in numbers and in calibre; and on the help of the engineers, both for cover in defence (deep dug-outs, concrete works, etc.) and for devices to aid the attack (offensive mining, improvement of communications, etc.). Mounted troops as such are of little value so long as the conditions of position warfare obtain.

4. In position warfare, as in open warfare, success will depend largely on the factor of surprise. For the attacker, surprise in the matter of place and time is difficult to achieve owing to the extensive nature of the preparations required (Sec. **85**), but is still possible and must always be sought: surprise in method—by the introduction of a new procedure or a new weapon—is the principal hope and must be the chief aim of the attacker in this type of warfare, where the defence has so many advantages. In the defence, similarly, new methods will be required to meet, or rather to anticipate, new forms of attack. The stagnation of movement which position warfare brings must never be allowed to induce a stagnancy of ideas: ten years of inconclusive position warfare were once ended in a single night by a new idea—the wooden horse of Troy.

5. The air forces will play a most important, possibly a decisive, part in protracted operations. The large and numerous camps, depots, workshops and installations of all kinds which are necessitated by the amount of material required in position warfare are likely to be the targets of intensive air attack, unless effectively protected by anti-aircraft guns and other means of air defence. Air photography also will be of the greatest importance in enabling the enemy's defensive dispositions or preparations for attack to be detected and recorded; the deception of the air camera by camouflage and other means, and the rival art of interpreting air photographs in spite of such deception, will assume considerable prominence. The struggle for air superiority is likely to lead to intensive air fighting.

6. A wide development of the intelligence system is a feature of position warfare (*see also* Manual of Military Intelligence in the Field, 1930, Chapter XV). To supplement the information obtained by air photography and reconnaissance, ground observation will be systematically organized and recorded, and the enemy's lines will be kept under constant and minute scrutiny. Raids may have to be undertaken if important information cannot be otherwise obtained (Sec. **85**, 4). It is of special importance to locate enemy machine-gun or mortar emplacements, and to watch for any new work that may give indication of the enemy's intentions. The sound-ranging and flash-spotting groups of the survey companies will be installed to locate the hostile battery positions. Personal reconnaissance by all grades of commanders and

knowledge of the conditions in the forward defences is just as necessary as in mobile warfare.

7. Position warfare is trying to the health, the morale and the discipline of troops. Sanitation requires special attention, and troops must be relieved, rested and trained under favourable conditions as frequently as possible.

84. The defence in position warfare

1. The principles laid down in Chapter VII are equally applicable to a protracted defence. The essential requirements are depth and elasticity. The original temporary defences will be gradually elaborated and improved, the obstacles in front of the position will be strengthened and extended, the defended localities will be connected up, communication trenches will be dug. As the defences are improved, and as the enemy's artillery concentration becomes more powerful, the dispositions of the defending troops will be altered; the forward localities will be held more lightly, so as to reduce losses and to enable the position to be organized in greater depth. The reasons given in Sec. **67**, 6, for defence in depth, i.e. that the attacker by concentrated artillery fire can usually shatter a selected portion of the forward defences, applies with greater force to position warfare. The defensive system must be organized so that the first shock is absorbed and the enemy's initial onrush checked, at as small a cost to the defender as possible, before it can penetrate to the main system.

2. Hence the eventual organization to be aimed at will be a *main system*, where the natural advantages of the ground have been strengthened by the best and most carefully concealed obstacles and defensive works that can be constructed in the time available; and an *outpost system* to act as a buffer and absorb the first shock. Both main system and outpost system will be organized in depth. Behind these again, at some distance in rear, if time and labour permit and there is a possibility of having to withstand very heavy attacks, *rear systems* may be constructed, or at all events reconnoitred and planned.

3. When an elaborate defensive system is laid out deliberately (as, for instance, rear systems), the location of the main system will be determined chiefly by the features of the ground, i.e. so as to make the best use of the observation,

cover and natural obstacles available (Sec. **68**); and the outpost system to cover it will be organized on the principles laid down in Sec. **69**. It will often happen that the forward defended localities of a position originally chosen for temporary defence will develop into the outpost system of a protracted defence.

4. Rear systems will be sufficiently distant from those in front to make it necessary for the enemy to organize a second and distinct operation, including the movement of his artillery, in order to attack them. It is often advisable to construct only a nucleus of the system, preference being given to work that takes time, e.g. concrete cover; and to complete the system when it is likely to be required; trenches can be dug and wired at short notice. This will save labour on upkeep and will prevent the system being prematurely mapped in detail by the enemy's air photography. Rear systems should be reconnoitred by all units of the defence that may be called on to occupy them.

5. One of the first steps in the improvement of a temporary position will be the connection by continuous trenches of the various posts and localities which form the framework of a defensive position. This facilitates control and reliefs and makes it difficult for the enemy to discover the actual dispositions of the defenders and thus causes him to disperse his fire. Continuous trenches also prevent a feeling of isolation among the troops and thus improve their morale; they also enable additional posts to be established between the main centres of resistance at night or in mist or fog; they require, however, considerable labour for their construction and upkeep.

Steps must be taken to provide cover for the garrison of defensive systems, firstly, from the weather, and, secondly, from hostile shelling. The best defence against heavy bombardment can be given only by mined dug-outs or concrete blockhouses, details of which are given in Military Engineering, Volume II. Mined dug-outs must have sufficient means of egress to allow the defenders time to man their fire positions to meet an infantry assault.

The concealment of works by camouflage will be of considerable importance: the efficiency of camouflage schemes will be tested by direct observation from the air and by air photographs, not only during the construction of the work, but at frequent intervals afterwards, in order to show how the

work is affected by the growth or decay of vegetation or other causes. Concealment by camouflage, or other means, of machine-gun positions and anti-tank weapons is of special importance.

Obstacles—wire or anti-tank obstacles—must be constructed in depth in accordance with a definite tactical plan, and are of little value unless covered by fire. It will be necessary to arrange that the movement of reinforcements or counter-attacking troops is not hampered by obstacles.

The provision of light railways or tramlines will greatly reduce the work required for bringing up ammunition and stores and will facilitate the evacuation of the wounded.

6. No more men than is absolutely necessary should be employed in holding the forward defences, as the duty is most harassing. Units should be relieved and rested at frequent intervals, but the infantry and artillery in the same sectors should not both be relieved at the same time. Details regarding reliefs will be found in Sec. **92.**

7. The general conduct of the defence and the delivery of counter-attacks will be on the same principles as in Sec. **70.** Defence schemes can be drawn up in some detail; and the action of all units in the event of enemy attack will be closely studied and should be practised, if possible.

Raids (Sec. **85,** 4) may occasionally be necessary to discover the intentions of the enemy, e.g. whether he is preparing to attack or for some other definite purpose, for much the same reasons, in fact, as sorties are made by a besieged garrison.

85. The attack in position warfare

1. The principles already laid down in Chapter VI apply equally to attacks in position warfare. The special characteristics of such an attack are that the enemy defences are more elaborate, are likely to extend to a great depth and are covered by obstacles which must be pierced or broken before the infantry can advance; on the other hand, the information at the disposal of the attacker as regards the location of the enemy defences will be far more detailed and accurate than in open warfare. The attacker will usually himself be entrenched close up to the hostile position.

Great resources in material will be required to deal with the strength of the enemy defences, the preparations will require considerable time and orders for the attack will be very detailed. The depth of the enemy defences may

necessitate a series of operations, separated by several days of careful preparation, before the organized defences can be finally pierced and the enemy driven into the open.

All this militates against secrecy and surprise, which should be the attacker's chief weapon. It will demand considerable ingenuity and extremely detailed staff work to carry out the necessary preliminary arrangements (such as concentration of the troops, the formation of ammunition dumps, the improvement of communications, the preparation of the forward area) without making the intention to attack too obvious. Much will depend on the nature and strength of the obstacle covering the enemy position; a wire obstacle may be broken by tanks without preliminary bombardment and surprise thus secured; but if the wire obstacle is so sited as to be unassailable by tanks, or if the position has been covered by minefields or tank obstacles, it may be necessary to cut the wire by artillery or mortar fire, which is a longer and more difficult process and makes surprise harder to achieve.

2. The attacker in making his plan has to decide on place, method and time, the considerations being much the same as in open warfare (Sec. **55,** 4). The following problems will, however, need special attention: how to deal with the hostile obstacle, i.e. cut gaps through it by artillery and mortar fire, destroy it by mining or other means, crush it with tanks or cross it by some specially devised method; whether or not to subject the enemy defences to artillery preparation, and, if so, for how long; whether to attempt a complete break-through of the enemy system in one operation or to proceed by stages, i.e. a number of successive operations with a limited objective, with a pause for preparation between them; and, most important, how to effect surprise.

3. The conduct of the attack in position warfare differs only in degree from that in open warfare (Sec. **57**) The artillery preparation, if undertaken, will be heavier and more prolonged in accordance with the strength of the hostile position; the attacking troops will be covered by a more intense and deeper barrage; the objectives of each successive body of troops are likely to be closer to each other owing to the probable greater severity of the fighting and higher percentage of casualties; special parties for clearing up each line of enemy trenches (" mopping-up " was an official term

in the Great War) may be required; and consolidation of successive objectives and protection of the flanks will need specially detailed arrangements. Another special problem of the advance in position warfare is the difficulty of establishing forward communications; the impediment of the enemy's wire and other obstacles, and of the network of trenches, intensified by the destruction caused by the bombardment, make the movement of wheeled transport very hazardous, especially as the enemy's artillery, unless overrun or silenced, is likely to keep all approaches to the fighting area under fire. It is therefore usually necessary to provide carrying parties to take forward to the troops who made the assault their requirements (e.g. water, rations, tools, wire, etc.), and to use engineers to improve the communications as rapidly as possible. The alternative, sometimes adopted in the past, of loading the assaulting troops with everything that they might conceivably need in the next 48 hours, is likely to cause failure of the assault by destroying its mobility and exhausting the men.

Some further details as to the conduct of the assault will be found in Secs. **86** to **90.**

4. Raids are attacks with a strictly limited and temporary objective from which the attackers return to their own defences. They should be undertaken only with a definite object, e.g. to destroy a minehead or mortar or other weapon which is causing trouble, or to obtain information or identifications which cannot be secured otherwise. Raids for the mere purpose of harassing the enemy and inflicting casualties are seldom desirable, unless the raider has a very definite superiority in position and in material. Otherwise they lead to reprisals and make the task of holding the forward defences more exhausting.

Raids must, on their scale, be prepared with the same care and attention to detail as large attacks; and will, like them, depend for success largely on surprise.

86. Artillery in position warfare

1. In position warfare, the proportion of the supporting arms, and especially of artillery, tends to increase; while the stationary conditions make the supply of ammunition easier. Hence the intensity of artillery fire is much greater; and pieces of a larger calibre than are normally used in mobile warfare, including short-ranged but powerful mortars, are

brought into action, either to destroy the enemy defences or to break up the assault. Methods of locating the hostile artillery, by sound-ranging, flash-spotting or other means, will be much developed; as a corollary, the concealment of batteries and the protection of material and personnel by defensive works will assume great importance. Survey methods will be highly developed so that predicted shooting can be undertaken with a high degree of accuracy. Artillery fire of considerable intensity will be normal, both in attack and defence.

2. In the defence, the bulk of the artillery will be sited so as to bring the full weight of its fire on an enemy attacking the main system. Support must also be given to the troops holding the outpost system to the extent required by the commander's plan; and a sufficient quantity of heavy and medium artillery must be far enough forward to harass the enemy's preparations and to undertake counter-battery tasks. It may sometimes be possible to carry out all these tasks from positions in the main system; but when the defensive system is very deep, it will be necessary to locate some guns in the outpost system. Artillery sited in an outpost system should have prepared positions in the main system to which to fall back in the event of loss or evacuation of the outpost system. Batteries in the main system should also have alternative positions to occupy if subjected to heavy artillery fire. The principles laid down in Sec. **74** will apply generally to artillery in the defence in position warfare.

3. The tasks of the artillery in the attack in position warfare will be similar to those outlined in Sec. **63.** The extent of artillery preparation will depend on the strength of the enemy defences and obstacles and on the arrangements for securing surprise. The shorter and more intense the preparation, the more likely is surprise to be achieved, but time is required if gaps have to be cut through a wire obstacle; heavy mortars are of value for this purpose. A barrage, organized in several belts, will be the normal form of covering fire. The bulk of the field guns will form the belt nearest the attacking troops: this belt will be continuous and will move forward by regular lifts on a definite time-table. The fire of other belts will be directed on specially selected areas and communications behind. The barrage may be deepened in parts by machine-gun fire. The attacking troops must follow as closely as possible behind the barrage so as to reach

the objective immediately after the barrage has lifted from it and before the enemy has time to man his defences. If a deep penetration is being effected, part of the artillery will be required to move forward to support the later stages of the attack.

87. Engineers in position warfare

1. The work and responsibilities of engineers in position warfare are onerous, both in attack and defence. In addition to the tasks which they perform in mobile warfare (Secs. **64** and **75**) they may have to undertake mining and counter-mining; the construction of deep shelters and of defensive works in concrete; the making of trench tramways and other improvements to communications; schemes for drainage and water supply. Behind the defensive lines they will be required for the construction of huts and other installations, the improvement of communications, and so forth.

In order that the available engineer personnel and material shall be used to the best advantage, a programme of work should be prepared by the general staff, in consultation with the senior engineer officers, for the approval of the commander concerned, and should be reviewed and revised periodically. Since the calls on the engineers will be very heavy, they should be reduced as far as possible by the other arms carrying out for themselves all works that involve little or no technical skill. The work of the engineers will involve the allotment to them of additional transport.

2. In the defence, the chief tasks of engineers will be the construction of mined dug-outs, shell-proof cover for headquarters, aid posts, observation posts, etc., concrete or tunnelled machine-gun emplacements, trench tramways and other improvements to communications, camouflage of important works, drainage schemes, water supply and, if necessary, counter-mining.

3. In the attack, the duties of engineers during the period of preparation will be skilled work to facilitate the concentration and deployment of the assaulting troops (e.g. accommodation and water supply) and their forward movement (e.g. clearance of obstacles, improvement of communications, erection of signboards, bridging); the construction of battle headquarters, observation posts, machine-gun and mortar emplacements, advanced dressing stations, etc.; the formation of dumps of tools and engineer material; preparations

for forward extension of trench tramways and other communications; special camouflage work.

During the attack, their principal task is likely to be the opening up of communications, including the bridging of trenches and other obstacles, to permit of the forward movement of armoured fighting vehicles (Sec. **88**, 1), guns, ammunition, supplies, etc. They may also be required to put captured localities into a state of defence; to open up water supply; to remove mines; or to extend or make trench tramways. As in mobile warfare, engineer reconnaissance parties should be pushed well forward, but the engineer units themselves should be held back until the tasks on which they are to be employed have been carefully reconnoitred and planned.

88. Tanks in position warfare

1. Tanks will be of especial value to the attacker in position warfare, since they can crush wire obstacles and thus enable a surprise to be more easily effected. If sufficient tanks can be collected in the early stages, they may be able to break rapidly through the enemy's defensive organization and prevent the operations ever reaching a really static phase.

The defender is likely, however, if he is given time, to cover his front with a continuous tank obstacle (trenches or minefields or other obstructions) as well as with a barbed wire obstacle against infantry. The attacker must then either devise some expedient that will enable his tanks to cross the obstacle intended to stop them, or must make the first assaults with infantry, reserving his tanks for the exploitation of success when the tank obstacles have been passed.

2. Tanks, when used in the attack, will be handled on the principles laid down in Sec. **60**. In the defence, tanks may be used for counter-attack, especially of hostile tanks (Sec. **71**).

89. Infantry in position warfare

1. The prolonged spells of holding trenches which fall to the lot of infantry in position warfare demand more than anything else good discipline and a good system, since the work is exacting and monotonous. A strict performance of the routine duties (such as posting and relief of sentries, manning of observation posts, standing to alarm posts at certain hours, and so forth) must always be required. The

work necessary for the proper upkeep of trenches and for sanitation must be planned so as to give the men a proper proportion of rest, but so that the defences are continually improved. No work should be done by night that can be carried out by day. Active patrolling by night should be carried out up to the enemy's forward defences so as to obtain all possible information of their dispositions and to prevent their obtaining information. By day, close observation and sniping will fulfil a similar purpose (Sec. **83,** 6).

2. If a wire obstacle has to be cut by the artillery preliminary to the infantry assault, it is for the infantry to indicate where the gaps should be cut, and to prevent by machine-gun fire the repair of the gaps once they have been made. In the actual assault, infantry has usually either to follow in the wake of a tank attack to take over the ground won by the tanks, or to advance behind an artillery barrage; in the latter event the leading infantry must keep as close as possible to the bursting shells and must realize that the risk of casualties from a shell bursting short is much less than that of being too far behind the barrage and thus giving the enemy time to man his defences. The "leap-frog" method of attack, whereby fresh bodies of infantry pass through those which have captured the localities or trenches laid down as their objective, will be normal. It is usually necessary for special parties to be detailed to clear up each line of trenches, where enemy troops may still be concealed in deep dug-outs or shelters.

3. Both in attack and defence the frontages allotted to units will be less than in mobile warfare, owing to the great depth necessary in attack, and the continuous line of trenches to be guarded and kept up in defence.

90. Signals in position warfare

1. The conditions of position warfare require an extensive use of line telegraphy and of telephony; while the volume of hostile artillery fire and air bombing will necessitate special protection for signal offices and for cables. Signal offices should, wherever possible, be placed in deep mined dug-outs; while cables in the forward area should be buried at a depth sufficient to protect them from the shells of medium artillery. If the nature of the soil makes it impracticable to bury them to this depth, they should only be lightly buried—to make

12. Page 173. Section 90. *Delete* paragraph 3 and *substitute* :—

Amdt. 2 May, 1937

3. In the circumstances of position warfare it may be assumed that the enemy will be equipped with means of overhearing telegraph and telephone traffic on lines in front of divisional headquarters. When the enemy is considered to be in a position to carry out such interception, the general staff will notify that a danger zone exists in a divisional area.

Under these conditions line telegraph methods within the divisional area will be limited to those which can by technical means be rendered immune from overhearing, and instructions will be issued limiting the use of the telephone. As code names are used in a danger zone (*see* Appendix IV, Sec. V, 6), officers in rear of divisional or corps medium artillery headquarters who can telephone to those in front of them will be restricted to holders of lists of code names.

them proof against traffic and splinters—and should be duplicated on all main routes.

The making of a buried cable system entails a great deal of work and time: large working parties will be necessary for digging the cable trenches, since the personnel of signal units are sufficient only to provide the skilled technical labour. Such a system must be conceived and laid out to meet the probable permanent requirements of the area, as it cannot subsequently be altered without much labour. Headquarters must be sited so as to conform to the cable system once it is installed.

2. Even a buried system will not be proof against very heavy shelling, and alternative means of communication by W/T and V/T will be established and protected. In the attack, and often in the defence, liaison personnel, cyclists, runners and special message-carrying agencies, such as pigeons, dogs and even rockets, will be required.

3. In the circumstances of position warfare, it may be assumed that the enemy will be equipped with means to overhear telegraph and telephone traffic on forward lines. Special apparatus can be installed to protect telegraph traffic and precautionary measures must be taken to restrict the use of both telegraph and telephone on similar lines to the rules for the use of wireless telegraphy (Sec. **19**); these measures will include notification of the extent of the danger zone.

91. Gas in position warfare

1. If the enemy decides to use gas, the conditions of position warfare make it necessary to meet the possibility of its use in all forms—spraying or bombing from the air, shelling by artillery or mortars, discharge from projectors or cylinders. Large areas may also be contaminated by persistent gas, thus forming a "gas inundation" in the same way that a water inundation might be used as an obstacle.

2. Owing to the close contact between the two forces, the enemy is unlikely to employ gas spraying in the forward area where it may affect his own troops, but may use it extensively in attack on troops, camps, depots, etc., in rear areas and on the lines of communication, where adequate precautions must, therefore, be taken against this form of attack.

3. In the forward area, the enemy may attack by shelling from artillery and mortars or from projectors, or may make a

cloud attack from cylinders installed in his front line. The last method requires a favourable wind for its use.

In addition to the methods of protection outlined in Sec. **40**, it may be necessary to render shelters and dug-outs proof against gas by means of curtains or other special contrivances, which will be usually constructed by the engineers.

92. Reliefs in position warfare

1. Orders for a relief must lay down the time at which the officer commanding the relieving unit or formation will assume command, and the hour by which the relief will be completed. It will usually be necessary to lay down the routes to be followed by the incoming and outgoing troops; also the point at which relieving units come under the command of the commander of the formation in the line.

2. The commander of the relieving unit, together with such officers as he considers necessary, will visit the position to be taken over—by daylight, if possible—will obtain from the unit to be relieved information on all points which could assist the incoming unit and will settle the details of the relief. The information to be obtained will include the following:—

i. The defence scheme and maps; aeroplane photographs, if available.
ii. Information as to the enemy, his habits, snipers, machine-gun and mortar positions, his wire and other obstacles, normal artillery shelling, etc.
iii. Numbers of men and weapons (guns, machine guns, anti-tank guns, mortars, light machine guns) in the sector and their distribution; arrangements for artillery support.
iv. The position of listening posts, artillery and infantry observation posts.
v. The general condition of the defences and of wire and other obstacles; work in hand and proposed; mining operations, if any.
vi. Dug-out and shelter accommodation; positions of aid-posts or dressing stations.
vii. Points specially liable to attack; areas in sector under direct observation of enemy and danger points where fire is likely to cause casualties.

viii. Arrangements for intercommunication; precautions against enemy interception of messages.
ix. Light signals for artillery defensive fire or for machine-gun fire; the position of gas alarms and of anti-gas defence stores.
x. The position of units on flanks and their headquarters.
xi The position of trench and ammunition stores and supply arrangements for water, rations and ammunition.
xii. Sanitary arrangements.
xiii. The location of wagon or transport lines.

3. In infantry reliefs, the machine guns and mortars, the anti-tank platoon, intelligence section and a proportion of signallers should, whenever possible, take over 24 hours in advance of the remainder of the battalion and during daylight. In artillery reliefs, similarly, observation parties and complete reliefs of signallers should take over 24 hours in advance; and it is desirable that one section in each battery should also take over in advance.

4. Reliefs will, as a rule, be carried out under cover of darkness. Guides must be provided, either by the outgoing unit or by the incoming unit from among the men who have been in the position since the previous day. The rules for march discipline by night (Sec. **78**, 6) will be strictly observed; the pace in front must be very slow when going by a communication trench or over difficult ground. Every relieving party must receive orders as to the action which it will take in the event of an attack by the enemy while the relief is in progress.

5. No post will be evacuated until the relieving troops have taken over. Patrols will be sent out by the unit being relieved before the relief begins, and will remain out until the relief is complete. Immediately after the relief, all men of the relieving unit should be told off to their battle positions and should occupy them until their company (or battery, etc.) commander has been round and inspected the dispositions.

6. Officers handing over defences are responsible that all available information is given to the relieving troops and that defence schemes, maps, air photographs, etc., are handed over. Superior authority will lay down distinctly what weapons, tools and stores are "trench stores," to be handed over from one unit to another on relief.

CHAPTER X

SPECIAL TYPES OF WARFARE

93. General considerations

1. In the preceding chapters warfare in a highly developed country against a civilized enemy has been the type mainly considered. The principles laid down in these chapters are of general value, but the methods of their application to fighting in certain types of undeveloped countries will need modifications to meet the special problems created by the topography and climate of the country and the characteristics and tactics of the inhabitants. The present chapter gives an outline of these special problems and of the methods which experience has shown to be useful in dealing with them in the past. Although experience is a most valuable guide, new problems not covered by past experience are always likely to arise as conditions change in accordance with the progress of civilization and science, and will demand for their solution commonsense, imagination and a faculty for improvisation.

2. The particular types of country considered in this chapter are mountains, thick forest or bush and deserts. Each has its own special difficulties, but poverty of communications is common to all and has a chief influence on the conduct of operations. In mountains or in bush, the roads or tracks are usually few and narrow, and movement off them is difficult or impossible; in deserts, deep sand or rocks may in places make the use of wheeled transport impracticable, while scarcity of water will limit the number of troops and animals that can be employed. In mountains, bush or desert local resources are likely to be small, so that the bulk of the supplies required for the troops must be carried, often over long distances. Thus in all three types of country the size of columns must be reduced as much as possible; small detachments will be frequent; and much will depend on the self-reliance, skill and initiative of junior officers. It will often be necessary to spend much time in improving or in making communications. Sanitation and medical arrangements will need special attention.

3. The successful conduct of operations will depend greatly on good information, topographical, ethnographical and tactical, which is often difficult to obtain. The organization of a good intelligence service will be one of the principal cares of a commander in this type of warfare. Accurate topographical information, of the routes, of the water supply, of weather conditions, etc., will be of special importance. Intelligence of the various peoples and tribes, their religion, their attitude, their armament, numbers of fighting men, resources, etc., will also be required. Maps may be unavailable or unreliable, and mapping from air photography or ground reconnaissance may be necessary.

94. Considerations as to the type of enemy

1. Although it will sometimes happen that our opponents in the type of countries under consideration will be civilized and highly trained troops or native troops trained and led by Europeans (as, for instance, in East and West Africa during the Great War), it is more likely that the enemy will consist of unorganized tribesmen, whose armament, tactics and fighting qualities will vary considerably. The advantages enjoyed by this type of enemy are his mobility, his independence of a supply organization or of lines of communication, his intimate knowledge of the country and a natural aptitude for guerilla warfare and for stratagems, ambushes and surprises. His tactics will usually be to avoid engagements on any large scale; to collect for some enterprise such as a raid on a camp or convoy and then rapidly to disperse; to attack the flank or rear of a column or its transport rather than oppose it directly; to watch for an opportunity and to take advantage of any carelessness or rashness on the part of a detachment. He is unlikely to possess artillery or aircraft, but is likely to be well armed with modern rifles and possibly a few automatics: his supply of ammunition is, however, likely to be precarious and limited. His desire for loot, in the shape of rifles, ammunition and other stores, makes it necessary that all equipment and stores should be carefully guarded and escorted at all times; it may sometimes, however, be turned to account in setting a trap or ambush.

2. The main problems and disabilities of the regular troops lie in their dependence on a complex supply organization, their comparative slowness, the difficulty of finding an objective that will force the enemy to collect and give battle, the lack of reliable information and, very often, the difficulty of distinguishing foe from peaceful inhabitant, since the former may become the latter and the latter change into the former with little more time or warning than is needed for the hiding or disinterring of a rifle and ammunition. Since savage foes usually give no quarter, it is essential that special arrangements should be made for carrying off all wounded, especially in a withdrawal; and sometimes the dead, if the enemy has the unpleasant habit of mutilating corpses.

The advantages of the regular troops lie in their superior discipline, organization and armament, in their possession of air forces and armoured fighting vehicles, and on the moral ascendancy which the civilized man feels over the uncivilized. They must reduce the enemy's advantage in mobility by good organization, good training and light equipment, and by exploiting their air force, armoured fighting vehicles, mechanical transport and other resources of civilization and science whenever conditions permit; they must, by a good intelligence organization, lessen the handicap of the enemy's better knowledge of the terrain and easier sources of information; they must counter his attempts at surprise by the vigilance and steadiness which discipline makes possible; and must meet his stratagems and cunning by commonsense and by counter-strategem. Vigorous and bold action, even in the face of greatly superior numbers, will maintain a moral ascendancy and is usually the safest and surest road to success. Hesitation and delay, withdrawal in face of the enemy or any other sign of weakness will encourage the enemy, and may double or treble his numbers in a short time by causing waverers to reinforce the active fighters. A savage foe has his opponent always under observation, even when his presence is unsuspected; and any slackness or perfunctory performance of protective duties, reconnaissance, etc., is not likely to pass unpunished for long.

3. Since the armed forces of an uncivilized enemy collect and disperse at will, the first difficulty will often be to find a suitable objective for operations. An advance on the enemy's capital or chief village or wells may be the best means of bringing him to action. Once the enemy has been induced to give battle, every effort should be made to inflict a decisive

defeat and to follow him up till his resistance is at an end. Should the enemy refuse to make any organized resistance, it may be necessary to occupy his country, to seize his flocks or destroy his crops and villages to secure submission. Blockade may sometimes be an effective weapon.

4. Whether or not to undertake operations by night against an uncivilized enemy cannot be made a matter of rule. On the one hand, savage enemies see better than civilized troops at night, move more silently and are better accustomed to the ground; on the other hand, many tribesmen dislike fighting at night—especially in cold weather—are apt to relax all precautions after darkness and may easily be surprised. Troops should not attempt night operations in this type of warfare unless well trained and unless time has been available for reconnaissance and preparation; but a well-planned night operation will often effect surprise and may save many casualties.

95. Air force co-operation in uncivilized warfare

1. The difficulties of communications that hamper the action of troops in mountains, bush and desert have comparatively little effect on air forces, though aerodromes and landing grounds may be difficult to find in mountains or bush. The air force can sometimes bring an uncivilized enemy to terms by air action alone or by the threat of air action. On the other hand, a well-planned combination of air action and ground action will sometimes be preferable. The general system of co-operation will be in accordance with the principles already laid down (Secs. **8, 29, 32**), but there will be certain differences of method occasioned by the nature of the enemy. For instance, since the enemy will not usually have any aircraft or anti-aircraft artillery, there need be no diversion of effort to secure air superiority, and the work of the aeroplanes will be unhampered by enemy interference except by rifle fire from the ground. On the other hand, reconnaissance of the enemy's dispositions is hampered by the fact that he will have neither organized base nor line of supply, may not move in formed bodies nor collect in large numbers, and will find easy means of concealment in bush or in mountains. The location of the enemy under such conditions is often a most difficult task, but a closely pressed search by aircraft, even if unsuccessful, will greatly restrict hostile movements. This is often of great value in piqueting

operations in mountain warfare (Sec. 97, 3). Topographical reconnaissance will always be of special value, and mapping of undeveloped country by air photography will sometimes be required.

2. The policy regarding offensive action by the air force (bombing and the use of machine guns) will require careful consideration in accordance with the general plan. Thus such action may be of great value to compensate for the lack of artillery in difficult country and to help troops forward or to prevent the enemy leaving some cover in which he has been located, and thus to enable the troops to bring him to action or surround him. On the other hand, premature attack by the air force may cause the dispersion of bodies of tribesmen whom the troops wish to bring to battle. There must thus always be the closest possible touch between the military and air force commanders concerned. This will often require special arrangements, both as regards signal communication and liaison personnel, since the lack of aerodromes may compel the separation of military and air force headquarters. Some method of signalling between the troops on the ground and the co-operating aircraft is most desirable, since the assistance which aircraft can give will often depend on the troops being able to indicate the direction from which they are being opposed.

3. There will also be a number of ancillary uses which aircraft may sometimes be called upon to undertake in operations in undeveloped countries with poor communications. Besides mapping, mentioned above, the carrying of small bodies of troops to points of importance; the evacuation of wounded, when distances are large; the dropping of supplies on isolated columns; and intercommunication between separated forces are possible methods of promoting the success of the operations. Aeroplanes may also be used to drop warnings or propaganda on neutral or hostile tribesmen with whom it would not otherwise be possible to communicate.

96. Armoured fighting vehicles in uncivilized warfare

1. Since the enemy will have little or no artillery, armoured fighting vehicles can be freely employed in offensive operations whenever the ground is suitable, and will have a great moral and material value. The nature of the country will, however, often hamper or forbid their use: rocky

mountains, thick bush, sandy desert or ground cut up by many streams or irrigation ditches limit their employment. On the other hand, there will in mountain warfare be many areas where broad valleys or low foothills will allow tanks or armoured cars to operate; there may be large clearings or open spaces in a bush country; and many deserts are hard enough for armoured cars or tanks to manœuvre freely and at speed. The length and limited capacity of communications may restrict the supply of petrol, and thus the number of vehicles that can be maintained; but so great is their offensive power and moral effect that armoured fighting vehicles should always be used against uncivilized enemies where conditions permit.

2. Tanks or armoured cars will be equally valuable in an attack on the enemy in position, in cutting off his retreat, or in pursuit, or in rearguard action. Armoured cars will also be useful for the protection of convoys. In perimeter camps, armoured fighting vehicles should not be given any portion of the perimeter to hold, but should be kept as a mobile reserve.

97. Mountain warfare

1. The chief military feature of mountains, whether the foe be civilized or uncivilized, is that the principal routes for movement—usually few and difficult—the principal centres of life and cultivation and the principal supplies of water lie in the valleys; whereas the high ground has the advantage over the valley in observation and command, and therefore in facilities for attack and defence. In other words, strategically the valleys are more important, tactically the heights and the passes or defiles between one valley and another, as these are likely scenes of combat. Extremes of climate are likely to be experienced in most mountainous areas; if operations are to take place at high altitudes, troops and animals will require acclimatization. If mountains are covered with thick forest or bush, the conditions of bush warfare (Sec. 98) may apply.

2. The effect of the limited means of communication and of the impossibility in a confined valley of deploying rapidly on to a broad front is that columns must be small and may be widely separated; that they must be lightly equipped; and that transport must be cut down to a minimum. Operations in hill country require a high proportion of infantry, since

armoured fighting vehicles and mounted troops—though of the greatest value where the ground permits their use—are often handicapped, and may even be prevented from operating at all, by the steepness and broken nature of the ground. The amount of artillery that can be taken is dependent on the communications; howitzers are more useful than guns. Engineers will be required for improvement of the roads and development of the water supply. The transport may have in difficult hills to consist entirely of pack animals, so that the supply and baggage columns will be unwieldy and vulnerable.

Other consequences of this type of country are: that, while strategical movement is usually confined to the valleys, tactical movement either in attack or retirement should always be along spurs or ridges rather than in the depressions between them; that the facilities for infantry covering fire, either overhead or between adjacent parallel spurs, are frequent and should be utilized to the full; that owing to the impossibility of digging in rocky ground defences usually consist of stone breastworks (termed "sangars" on the N.W. frontier of India); and that proficiency in visual signalling has considerable value. A high degree of training and physical fitness is required for success in hill fighting.

3. The above considerations are applicable to all warfare in mountains; if the opponent is an uncivilized tribesman of the type of the Pathan on the N.W. frontier of India, certain additional difficulties have to be taken into account by regular troops, i.e. the great mobility of their enemy, his skill in concealment, his markmanship, his preference for harassing tactics rather than organized resistance, especially for attacks on the rear and flanks of a column, on convoys or small posts and detachments. The features and tactics of fighting against such opponents are dealt with in detail in the Manual of Operations on the N.W. frontier of India. The problems of protection need especial care, since the enemy is quick to take advantage of any mistake or carelessness. Flank protection of a column on the march is normally carried out by a system of stationary piquets holding high ground on either side of the route, and so preventing the enemy firing on or attacking the column below; these piquets are put out from the advanced guard and withdrawn by the rear guard; their posting and withdrawal require considerable skill and experience on the part both of commander and troops. In attack, boldness is

essential; the tribesman is especially sensitive to a threat to his flanks or rear. The enemy seeks his chief opportunity against a retiring foe, and will often attack a rear guard with great persistence and vigour; in contrast to civilized warfare, it is sometimes necessary to regulate the pace of the main body by the progress of the rear guard; it is essential that the withdrawal should be completed in daylight.

The protection of a column while at rest is on a rather different system to civilized warfare, since a night attack on the camp or bivouac from any direction is always a possibility. The camp or bivouac—which must be selected in time to allow all defensive preparations to be completed before dark—is enclosed by a perimeter prepared for defence and held usually by the infantry, with the other arms, transport, etc., within the perimeter. Outside the perimeter are posted the camp piquets, self-contained and prepared for all-round defence, so as to watch dangerous approaches, and to deny to the enemy commanding ground from which he could bring effective fire to bear on the camp by day or night. Patrolling at night is usually impracticable, except by specially trained men, but opportunities may sometimes be taken to prepare ambushes.

Posts and convoys on the lines of communication are often targets of attack by the ubiquitous enemy; routes regularly used by convoys are therefore usually protected by permanent piquets in sangars. In addition, mobile bodies of troops should be located at suitable places along the route to carry out offensive patrolling in the vicinity of the route. It is also usually necessary for some form of escort to accompany the convoy itself.

It is likely that in future expeditions into hill country held by uncivilized tribes road making will play a more important part. As the result of recent inventions, roads are likely in the future to be made with much greater ease and rapidity than in the past, and their construction will enable the superior armament and resources of regular armies to be more fully exploited.

98. Bush and forest warfare

1. Fighting in thick forest or bush is subject to the same, or even greater, limitations to free movement as is fighting in mountains: tracks only a few feet wide may be the best routes available, and movement off them impossible except

when a path is cut. In addition, visibility is very restricted, varying maybe from a few yards to a few hundred yards. The keeping of direction presents great difficulty and constant use of the compass is essential. Hence manœuvre is very limited, and the methods of fighting simpler and more primitive than in open country. Good discipline, good organization, a good intelligence system and bold and determined leading are the main essentials for success. Clearings, or areas where the bush is less thick, have considerable tactical importance.

2. Thick forest and bush are usually found in tropical countries; hence the additional handicaps of a tropical climate—heat, heavy rains, unhealthy conditions—have often to be taken into account: good sanitation is then of the greatest importance. In some parts, owing to the lack of roads and to the fact that animals cannot live, carrier transport has to be employed, which is slow and liable to panic, and has a very small load-carrying capacity; a column may require more carriers than there are fighting men, and may be forced by the narrowness of the path to move in single file. In such conditions fighting is almost entirely done by infantry: the country is too thick for armoured fighting vehicles, and usually also for mounted troops, even if the animals can live; difficulties of transport limit the amount of artillery and ammunition that can accompany a column and lack of visibility deprives it of the advantage of long range; mountain artillery and mortars are therefore of most value. (*See* Sec. **95** as regards the use of the air force.)

3. If the enemy consists of trained troops led by Europeans, they also are subject to the general limitations already set out. If the enemy are untrained savages, whose armament may vary from modern rifles to bows and arrows, spears, muzzle-loading guns, they will have similar advantages and characteristics to those outlined in Sec. **94**, 3—mobility, knowledge of the country, avoidance of pitched actions and preference for harassing tactics, nervousness as to their own flanks and susceptibility to moral influences. Generally speaking, however, bush men are less hardy and formidable than hill men.

The tactics of fighting against such enemies in such conditions are given in some detail in Notes of Training in Bush Warfare, issued by the Colonial Office. Apart from the precepts to be observed in all warfare against a savage enemy

(Sec. **94**), the main characteristics of fighting in the bush may be summarized as follows: reconnaissance and the acquisition of information present special difficulties owing to the thick country, as does also the keeping of direction: measures of protection demand constant care; flank protection is assured by flankers a short distance out—from 20 yards to several hundred according to the thickness of the bush—either moving or stationary; the distance between the parts of a force on the move should be much less than in open country; camps and bivouacs are usually enclosed by a perimeter, as in mountain warfare, with a field of fire cleared where necessary; in attack, a chief problem is to locate the enemy's flanks; visual signalling is usually of little value, and reliance is placed mainly on W/T and telephones.

4. In bush, as in mountain warfare, conditions are changing, and the number of roads already constructed and the facilities for making fresh roads with speed are increasing. Where motor transport can replace carriers, the task of the trained troops is simplified, since greater use can be made of the resources of civilization.

99. Desert warfare

1. The special characteristic of desert warfare is the dependence of movement and strategy on the location and quantity of the water supplies. Deserts may consist of heavy sand, difficult for wheels and for marching men and for animals other than camels; or may have a hard surface which permits of the movement of mechanical transport. There are seldom any well-defined roads, but tracks known to the local inhabitants usually exist between wells; and hard desert is often passable anywhere by mechanical transport at considerable speed. Stretches of heavy sand may be made more passable for wheels by the expedient of pegging down wire-netting on it; sand tyres and ped-rails are other devices which will enable wheels to cross heavy sand. There are few land marks in the desert and maintenance of direction is often difficult; mirage may be a frequent source of error. Operations usually hinge on the attack and protection of the main water supplies. If mechanized troops can be used, the water problem is very much simplified, since mechanical units can without difficulty carry with them their own water requirements for 48 hours.

2. The enemy, or a proportion, will often be mounted, and will in any event possess great mobility. His tactics are likely to be the usual tactics of uncivilized warriors, i.e. to harass the flanks and rear of columns, to attempt to cut off detached parties, transport or stragglers, to attack an ill-protected camp or bivouac, but to avoid a general engagement.

3. Aeroplanes and armoured cars are pre-eminently the weapons to use against desert tribes (*see* Sec. **95**). The enemy has little concealment or cover from aeroplanes, while the speed and fire power of armoured cars and their comparative independence of water give them great value wherever the desert is hard enough for them to move freely. Light lorries or motor-cars fitted with a machine gun or automatic weapon are often just as effective and more mobile than armoured cars. Infantry carried in mechanical transport or transported by air may be employed to hold points of tactical or strategical importance such as wells. Every effort should in fact be used to out-do the enemy in his asset of mobility.

If infantry are required to move on foot across open desert country against a fanatical enemy capable of shock tactics, such as Somalis or Sudanese, a formation in the shape of a loose square, with the transport in the middle, may be adopted. Perimeter camps will be used at night, as in mountain or bush warfare.

APPENDIX I

PARTICULARS OF ARMOURED FIGHTING VEHICLES

Serial No.	Type	Category	Approximate weight fully equipped * Tons Cwt.	Circuit of action on roads Miles	Average speed On roads m.p.h.	Average speed Cross-country m.p.h.†	In the dark on roads. With lights	In the dark on roads. Without lights	Armament	Width of ditch crossable	Depth fordable (good bottom)	Remarks
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(k)	(l)	(m)
1	Armoured car	Heavy 6-wheeled	7 5	130	25	5–10	20	7	One ·5-in. M.G. Two ·303-in. M.Gs.	—	1 ft. 6 in.	If wireless is carried, one ·303-in. M.G. is removed.
2	Armoured car	Light 6-wheeled	5 —	110	25	7–12	20	7	Two ·303-in. M.Gs.	—	1 ft. 6 in.	
3	Tank	Light Mk. IV	4 3	130	20	7–12	15	5	One ·303-in. M.G. or One ·5-in. M.G.	5 ft. 3 in.	2 ft. 6 in.	
4	Tank	Light, Mk. V	4 15	150	20	7–12	15	5	One ·303-in. M.G. One ·5-in. M.G.	5 ft. 3 in.	3 ft.	Co-axially mounted.
5	Tank	Medium, Mk. II	14 10	100	10	5–8	10	5	One 3-pr. gun Three ·303-in. M.Gs.	6 ft. 6 in.	3 ft.	Gun and one M.G. co-axial —remainder hull guns.
6	Tank	Medium, Mk. II (Close Support)	14 10	100	10	5–8	10	5	One 15-pr. How. Three ·303-in. M.Gs.	6 ft. 6 in.	3 ft.	How. and one M.G. co-axial —remainder hull guns.

* Including crew.
† Dependent on type of country.

APPENDIX II

PARTICULARS OF INFANTRY WEAPONS

Serial No.	Weapon	Calibre inches	Approximate weight lb.	Rates of fire, rounds a min.			Maximum effective range yds.	Remarks
				Rapid	Medium	Slow		
	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)	(*g*)	(*h*)
1	Rifle	·303	9	15	—	5	1,000	A shoulder controlled weapon to which can be affixed a bayonet or a discharger cup (*see* Serial 2 below). Individual fire is rarely effective beyond 600 yards.
2	Hand grenade, H.E.	2½	1½	—	—	—	By discharger 80/200. By hand, 30.	The hand grenade can also be fired from a discharger cup attached to the rifle. The grenade is propelled by a blank cartridge filled with ballistite.
3	Smoke grenade	2½	1¼	—	—	—	250	Fired from a discharger cup.

4	Light machine gun	·303	Gun 21 Tripod 23	200	100	30/60	Bipod 1000 Tripod 2000	An air-cooled gun capable of being fired from the shoulder with bipod, or on a tripod; it can be laid on fixed lines.
5	Light machine gun. (Lewis)	·303	26	150	—	—	1,000	A shoulder controlled weapon with no equipment for laying on fixed lines.
6	Machine gun. (Vickers)	·303	Tripod 56. Gun (with 10 lb. of water) 42.	250	125	60/75	2,000	This gun is water-cooled and capable of sustained rapid fire. Its heavy mounting admits of laying on fixed lines and of indirect fire. It has an all-round traverse.
7	3-in. Mortar	3	Piece, 44. Base plate 37. Bipod, sight, box and cradle } 45	40	—	—	1,500	Each bomb weighs 10 lb. 25 per cent. of smoke bombs, are carried. Mortars are usually ineffective against buildings.

APPENDIX III

PARTICULARS OF ARTILLERY WEAPONS

Serial No.	Classification	Equipment	Weight of shell	Maximum range		Type of shell carried			Method of traction	Mobility m.p.h.	Normal employment
				H.E.	Shrapnel	Shell	Proportion carried	Approximate number of rounds per gun with Btys. (Note)			
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(j)	(k)	(l)
1	Anti-Aircraft.	3-in. 20-cwt. gun	16 lb.	18,000 ft. height 7,000 yds. range	10,000 ft. height 7,000 yds. range	Shrapnel, H.E.	12 88	40 310	Mechanical	8–12	The destruction or hindrance of hostile aircraft.
2	Horse	3·7-in. Q.F. How.	.....	.....	... *See* Serial 3.....		.....	.....	Mechanical or horsed	12–15	Co-operation with mobile troops.
3	Mountain	3·7-in. Q.F. How.	20 lb.	6,000	6,000	H E. Shrapnel	71 29	68 28	Pack or mule draught	4	Suitable for employment in types of country where wheeled or tracked vehicles are unable to operate.
4	Field	18-pr. Q.F. Gun	18½ lb.	10,000*	6,600	Shrapnel H.E. Smoke	52 37 11	90 70 20	Horsed Mechanical	4–5 12–15	Co-operation with infantry and tanks by providing artillery preparation and covering fire in attack, counter-preparation and defensive fire in defence; harassing fire. Suitable for use against troops in the open or entrenched. In addition the 18-pr. gun are suited for use against tanks, and 4·5-in. how. for the destruction of field defences, production of smoke screens, counter-battery fire and wire cutting.
5		4·5-in. Q.F. How.	35 lb.	6,800	—	H.E. Smoke	75 25	100 35	Horsed Mechanical	4–5 12–15	
6	Medium	60-pr. gun	82 lb.	13,000	11,000	Shrapnel H.E.	50 50	50 50	Mechanical	8	Used for long range counter-battery work, but not powerful enough to destroy strong emplacements. 60-pr. gun is suitable for engaging important targets in the open such as troops and transport on roads, headquarters, etc., and for harassing fire beyond the range of field guns. 6-in. how. is suitable for the destruction of defences.
7		6-in. How.	100 lb. 85½ lb.	9,800 11,400	— —	H.E.	100	100	Mechanical	8	
8	Heavy	6-in. gun	100 lb.	19,200	15,900	Shrapnel H.E.	40 60	15 25	Mechanical	5	Used for long range counter-battery work and to engage distant targets such as roads, headquarters, camps and dumps, and kite balloons.
9		8-in. How.	200 lb.	12,400	—	H.E.	100	45	Mechanical	5	Used for counter-battery work, especially against strongly constructed emplacements, and for the destruction of strong defences.
10		9·2-in. How.	290 lb.	13,000	—	H.E.	100	30	Mechanical	5	
11	Super-heavy	9·2-in. guns and upwards	380 lb. and upwards	25,000	—	H.E.	100		Railway mountings		As for heavy guns, but of greater ranges. (These guns wear out quickly.)
12		12-in. How. and upwards	750 lb. and upwards	14,300	—	H.E.	100	—	Mechanical	—	Destruction of specially strong defences, gun emplacements and bridges.

* The range of 18-pr. Guns, Mks. I to II*, is 6,600 yds.

RATES OF FIRE

The following are the standard rates of fire for different natures of artillery:

TABLE OF RATES OF FIRE IN ROUNDS A GUN A MINUTE

Term (Rate of fire)	3·7-in. How.	18-pr. gun	4·5-in. How.	60-pr. gun 6-in. How.	8-in. How., 9·2-in. How.	6-in. gun	12-in. or 16-in. How.
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
"Gun fire"	As fast as aimed rounds can be fired						
"Intense"	5	8	4	2	2	—	—
"Rapid"	3	4	3	1½	1	—	—
"Normal"	2	3	2	1	½	¼	1/6
"Slow"	1	2	1	⅔	⅓	⅛	1/10
"Very slow"	½	1	½	⅓	⅓	⅛	1/20

Note.—For information regarding the replenishment of ammunition, *see* Field Service Regulations, Volume I.

APPENDIX IV

RULES FOR DRAFTING ORDERS, INSTRUCTIONS, REPORTS AND MESSAGES

I. General

1. Except when code names are used (*see* Sec. V, 6, below), units and formations will be described by the authorized abbreviations given in the Field Service Pocket Book; ordinal numbers written as words will be used to denote armies, e.g. First (Second, etc.) Army. Cardinal numbers (written as figures) will be used to denote particular formations or units (e.g. 1 Div. [1st Division], 2 R.W.K. [2nd Battalion The Royal West Kent Regt.]). Otherwise, numbers will be written as words, e.g.:

"Two med btys are placed under the command of 3 div."

When it is desired to refer to a unit or formation from which a portion is excluded, the unit or formation will be named and the words "less . . . " used, e.g.:

"2 div less two inf bdes."
"1 RF less two coys."

2. Officers are not expected to memorize all the authorized abbreviations given in the Field Service Pocket Book, but abbreviations other than those authorized will be used only when no authorized abbreviation exists, and it is not possible that the abbreviation will be misunderstood.

The writer of an order, report, etc., must exercise judgment in the use of abbreviations and avoid those with which the addressee is unlikely to be familiar.

3. Place, personal, code and regimental names, and the word "NOT" should always be written in block capitals.

4. Indefinite terms such as "dawn," "dusk," should never be used; conditional terms such as "as soon as possible," "should," "may" are dangerous in an order or instruction, and will only be used when it is not possible to be definite.

5. Unless otherwise stated, the time and place of arrival of a body of troops refer to the head of the main body.

II. Date

1. All orders, instructions, reports and messages must be dated. Dates will be written in the form " 3 Sep 36," and not in the numeral form " 3/9/36."

The names of months will be abbreviated by the use of the first three letters.

In using the message form (A.F. C 2123) neither the month nor the year will be inserted in the date space, which is for the day of the month only.

2. A night will be described by both dates over which the night extends, e.g. :

" night 29/30 Sep "
" night 30 Sep/1 Oct "

III. Time

1. Time will be described by reference to the 24-hour clock. Groups of four figures followed by " hrs " will be used. The first two figures represent the hour and the last two the minutes past the hour.

Example (Date—3 Sep).

" 0001 hrs " : one minute past midnight, night 2/3 Sep.
" 0900 hrs " : nine o'clock in the morning.
" 1200 hrs " : noon.
" 1635 hrs " : twenty-five minutes to five in the afternoon.
" 2400 hrs " : midnight 3/4 Sep.

The abbreviation " hrs " will not be used in the " Time of origin " space on the message form (A.F. C 2128).

2. When plans are being drawn up which are to be carried out in accordance with a time-table, it will be usual to base the timings on a time known as " zero hour "; this enables arrangements to be made in detail without the necessity of fixing or disclosing, until it is convenient to do so, the actual moment when the operation will begin. It will be the responsibility of the commander who issues the orders for an operation to define what constitutes zero hour for that particular operation : in attack, it will normally be the hour at which the leading troops of the attack cross their starting line. Zero hour will be described in accordance with the rules in para. 1, above. Any action to be taken *before* zero

13. Page 197. Appendix IV, Section III. *Delete* paragraph 3 and *substitute* :—

Amdt. 2 May, 1937

3. i. In communication between units (including inter-service communication) in the same time-keeping area, the local time of the area will be used both for times of origin and times occurring in the subject-matter of a message. Times will not be followed by the group LT.

ii. In communicating with any authority that is in a different time-keeping area, or whose whereabouts are not known, G.M.T. will be used for all purposes, and all times in the subject-matter and time of origin will be followed by the group GMT. This method will be used in all cases when any possible doubt may arise as to the recipient understanding references to local time, and is applicable in peace and war except for a specially planned combined operation for which special instructions are issued.

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hour will be timed as " zero minus (so many minutes) " ; action *after* zero hour will be timed as " zero plus (so many minutes)."

3. In communicating with any authority in a different country, the local time of the place of origin will normally be used, followed by the letters L.T. If it is probable that the recipient will not know the local time at the place of origin, Greenwich mean time will be used followed by the letters G.M.T.

IV. Place

1. The name of a place at which a headquarters is situated or from or to which a message is despatched will never be given unless it is essential to ensure correct transmission or delivery, or to make the sense plain.

2. Names of places will be written in block capitals, thus—LONDON, exactly as spelt on the maps in use. If more than one place of the same name exists, misunderstanding as to which is meant must be avoided by the use of a map reference.

3. If a map is referred to, the one used must be specified unless, in the knowledge of the sender, no confusion can arise by the omission of the information. When a map is specified, its description will be given under the heading of an order, instruction or report, and at the beginning of a message, e.g. " Reference 1-inch O.S. Sheet 114 (WINDSOR)."

4. Points will be described either by co-ordinates (if a squared or gridded map is available); or by giving the distance and direction from some easily found reference point, e.g. :

" Cross roads ½ mile SW of HASELEY."
" Cross roads true bearing 225° from HASELEY CHURCH."
" Cross roads ½ mile SW of second E in (NOT " of ") HASELEY " (the letter referred to being underlined except in messages to be transmitted by signal in which the underlining of individual letters of a word cannot be transmitted).

The use of co-ordinates enables a point to be described with great exactitude, but takes up time both in writing and reading, and introduces a considerable possibility of error; description by means of a reference point, as above, is often to be preferred.

5. The four cardinal points of the compass will be written in full, abbreviations with the letters "N," "S," "E" and "W" being used to denote intermediate points, e.g.:

"South of HASELEY" not "S of HASELEY."
"SW of HASELEY" not "South-West of HASELEY."

6. Roads will be indicated by place names on them, care being taken to name sufficient places to ensure that the road intended is followed. The word "road" will precede, not follow, the place names, e.g. "road BAGSHOT-CAMBERLEY," not "BAGSHOT-CAMBERLEY road." Railways may be similarly described.

7. An area will be described by taking the northernmost point first, and giving the remaining points in clockwise order.

Positions will be described from right to left looking towards the enemy.

8. Boundaries, if generally parallel to the line of advance or withdrawal, will be described from rear to front in advance, and from front to rear in defence and withdrawal. If generally parallel to the front line, they will be described from right to left.

In detailing boundaries between units and formations, the words "inclusive" or "exclusive," abbreviated to "incl" or "excl," will be used. These words should be written before the place to which they refer. A locality will be described as inclusive or exclusive to the unit or formation to which the writer belongs, rather than as exclusive or inclusive to another.

In an operation order, it is usually convenient to place all details of boundaries, including—so far as necessary—those laid down by a higher formation, in the "Method" paragraphs (*see* Sec. **15,** 4).

9. River banks may be described as "right" or "left," it being assumed that the writer is facing downstream.

10. The terms "right" and "left" applied to our own forces in retirement will be taken to refer to the original right and left flanks, as they were when facing the enemy.

11. Generally, when terms such as "right," "left," "before," "behind," "beyond," "front," "rear," "on the side of" are used to define a locality, it must be made clear to what they refer.

14. Page 199. Appendix IV, Section V.

Paragraph 3, line 1. *Delete* ", and when necessary, envelope C 398,".

5

Paragraph 5. *Add* new subparagraphs :—

Amdt. 2 May, 1937

In order to differentiate between those addressees to whom ne message is despatched for action and those to whom it is ddressed for information only, the originator will write the ord " repeated " before the first address of the latter ategory. The word " repeated " will be signalled and will lso appear on the copy of each recipient to whom it applies.

The originator will write the whole of the " address to " n the sequence in which it is to be signalled, *e.g.* " LUDO SAGO NOPA repeated FIDO BONO " and not in columns hus :—

LUDO FIDO
SAGO repeated BONO
NOPA

The message handed to a recipient will show all the ddresses included in the same circuit as himself, and all hose addresses except his own will be crossed out in the signal ffice before delivery. If the word " repeated " occurs efore his address, he will know that the message is repeated o him for information ; otherwise it is addressed to him for ction.

Since the Royal Navy and the Royal Air Force are not amiliar with the army use of " adrep " (*see* para. 11, below), he complete list of addresses written in the " address to " pace will be transmitted in signalling from an army station o a signal terminal of either of the other two services.

In order to ensure that administrative messages from a gher formation which should be dealt with at the rear eadquarters of a lower formation are not transmitted through ie rear headquarters to the headquarters and back again, ich messages will be addressed to the rear headquarters hether or not the originator has information that a rear eadquarters has been opened.

Delete paragraph 6 and *substitute* :—

Amdt. 2 May, 1937

6. The following rules govern the use of authorized bbreviations (*see* Appendix IV, Sec. I, 1) and code names to escribe formations and units.

At the headquarters of corps and higher formations the uthorized abbreviations will be used in the addresses and exts of written messages.

Within divisions, mobile divisions and corps medium artillery code names will be used in written messages whether for despatch by telegraph or despatch rider, except in messages originated at those headquarters addressed only to units and formations in rear or to other divisional or corps medium artillery headquarters. In these cases the authorized abbreviations will be used.

In radio telephony code names will be used, except within certain tank and cavalry units where special names are used.

In line telephony, when a danger zone has been notified, code names will be used when either speaker is in front of divisional headquarters.

address
special

6 Fo

Page 199. Appendix IV, Section V, paragraph 6, line 9. 1
For " corps to corps " *substitute* " division to division." 1937

quarters,

12. Bearings will be given as true bearings, except when a gridded map is used, when grid bearings will be given.

V. Messages

1. The large volume of signal traffic, due to the size of modern armies and the variety of arms composing them, and the necessity of enciphering W/T messages, render brevity, clearness and the strict observance of rules in the writing of messages of great importance.

2. Copies of all messages will be kept by the originator.

3. A.F. C 2128, and ~~when necessary, envelope C398~~, should be used for messages. Messages for D.R.L.S. will be placed in envelopes, marked D.R.L.S., signed by an officer and handed to the signal office. To enable the signal office to trace the receipt and acknowledgment of the message, the originator should put a reference number on the envelope.

4. Nothing must be written above the space provided for the address "To."

5. Address "To" and "From"—Addresses and originators of messages will be designated by their code names (*see* para. 6, below) or, when these are not used, by their abbreviated titles as indicated in the Field Service Pocket Book.

Officers, names and appointments will never appear in the address "To" or "From" unless it is essential for some special reason.*

Formations and units are allotted code names by the ...l staff.

... signal messages passing in front of divisional headquarters, the originators will use code names in the addresses and text.

Code names will be used similarly in all telephone conversations in front of divisional headquarters and in all W/T messages.

In messages from ~~corps to corps~~, and in messages behind corps headquarters, the originators will use the authorized abbreviations to denote formations and units.

7. If a message is to be delivered by signals to more than

* In the Royal Navy the call sign of a ship indicates the captain. If a message is for any other officer, the words "For . . ." should be inserted at the beginning of the text.

one addressee, one copy of the message should normally be handed in to the signal office for each addressee,* and all addressees must appear on each copy.

It may often be convenient for multiple addresses to be arranged in lists, e.g. " List A," " List B," etc., all concerned being informed of the composition of such lists.

8. The text will begin with the originator's distinguishing letters and number in the appropriate space. For the appropriate distinguishing letters, *see* Field Service Pocket Book.

Originators for whom no distinguishing letters are allotted in the Field Service Pocket Book may employ any combination of letters up to three in number, provided that they have not already been allotted and do not give any indication of the identity of the sender or his unit or formation.

9. The distinguishing letters will be followed by a number which will be the serial number of outgoing messages from the office or appointment held by the originator. A series will be repeated on reaching the figures 9999.

10. In the text, roman numerals and mathematical signs (e.g. those for yards, feet, inches, degrees, percentages, plus, and minus) cannot be telegraphed and must be replaced by words or recognized abbreviations (e.g. yds., ft., per cent). A full stop will be indicated by ⊙. No stop is required at the end of the text. Other punctuation signs are not transmitted in signal messages; care must therefore be taken that their omission will not alter the sense of the message.

Letters, ciphers and important words (*see* Sec I, 3, above) will be written in block letters, letter ciphers being arranged in groups of five letters.

Underlining and the use of dashes or oblique strokes should be resorted to only when absolutely necessary, e.g.:

" W/T," " Night 2/3 Sep."

Only one word, or abbreviated word, or combination of letters undoubtedly meaning one thing, or the sign indicating a full stop will be written in each space of the message form, e.g.:

" KOYLI," " LINCOLNS," " arty," " CRA," will each occupy one space.

* When this is not necessary, the signal officer will inform the originator concerned.

Page 200. Appendix IV, Section V, paragraph 10, line 17.—*After* " form " *insert* " † " and *add* as footnote to the page :—

When the message is typed, the ordinary full stop "." be used in lieu of "⊙" but, if this is done, nothing else t be typed in the same space.

Amdt. 1 April, 1936

15. Page 201. *Delete* paragraph 11 and *substitute* :—

Amdt. 2 May, 1937

11. When it is desired to inform addressees that a message has been sent to other addressees, the abbreviation " adrep " will be inserted at the end of the message. Its use will indicate to the recipient that the message has been sent to more than one addressee and that the originator accepts responsibility that it has been addressed and repeated to all concerned.

If an acknowledgment is required from those who have to take action on the message, *i.e.* those to whom it has been addressed, " ack " will precede " adrep." If an acknowledgment is also required from those to whom the message has been repeated, " all ack " will precede " adrep."

In order to reduce the signal traffic to a minimum, an acknowledgment will be asked for only when it is urgently necessary for the sender to know that a particular message has been received.

16. Paragraph 14.

Line 1. *Delete* " reports and ".

Lines 2 and 3. *Delete* from " rank " to the end of line 3 and *substitute* " name and rank only."

May, 1937

[illegible] address messages the copies for some of the addressees may require a degree of priority and the copies for other addressees may not.

Originators will ensure that a degree of priority is given only to those copies which require it.

1. When it is desired to inform addressees that the message been sent to other addressees, it will be ended thus:

Using code names) "Addsd BOLO NEPA KILU."

n clear) "Addsd 1 and 3 divs RA 2 div" or
"Addsd List A."

Then action is required by some addressees only and the sage is to be sent to others for information, the message be ended thus:—

Using code names) "Addsd BOLO reptd NEPA KILU."

n clear) "Addsd 1 div reptd 3 div RA 2 div."

an acknowledgment is required from those who have to action on a message, i.e. those to whom it is "addsd," " will precede "addsd." If an acknowledgment is required from those to whom the message is "reptd," ack" will precede "addsd." But in order to reduce the volume of signal traffic to a minimum, an acknowledgment will be asked for only when it is urgently necessary for the sender to know that a particular message has been received.

12. The time at which the message is signed by the originator will be entered in the "Time of Origin" space.

13. The "THI" (Time handed in) space is for use in signal offices, and the time entered in it may be used for calculating the time of transmission.

14. All reports and messages will be signed by the originator with his rank and appointment and the formation or unit to which he belongs.

15. The originator is responsible for warning the intercommunication personnel of any precautions necessary in the method of transmission of a signal message. This he does normally by signing in the appropriate space at the foot of A.F. C 2128. When neither space meets requirements he will give his instructions as to method in the space marked "Degree of priority and instructions by originator."

It is unnecessary for the originator to delete the space not signed.

If a special degree of priority (*see* Sec. **18**, 2) is required for a message, the words (e.g. emergency operations, etc.) will be written in full in the space marked "Degree of priority and instructions by originator."

Abbreviations will not be used.

18. Page 202, paragraph 16, line 2.

For " corps " *substitute* " divisional ".

For specimen message form *substitute* specimen form attached hereto.

APPENDIX V

ADMINISTRATIVE MATTERS WHICH MAY REQUIRE CONSIDERATION IN THE PREPARATION OF OPERATION ORDERS OR ADMINISTRATIVE ORDERS

The matters in the following table may have to be considered in the preparation of the administrative paragraphs of operation orders, or in separate administrative orders when such are issued. Several of them concern the orders of higher formations only (Armies, Corps or Divisions). Administrative, like other, orders should be as concise as possible, and should include only such matter as is essential for the purpose in view.

Matters of routine which are normally dealt with in *standing orders* are not included in the table.

Accommodation	Administrative areas; billeting arrangements; enclosures for prisoners of war.
Ammunition ...	Railheads; refilling points; ammunition points; special arrangements for advance or withdrawal; location and stocks of temporary depots; responsibility and labour for working depots; accountancy instructions. NOTE.—If an allotment of rounds for each gun is made or a limit set to expenditure, instructions for this are issued by the general staff after consultation with the administrative branches of the staff.
Baggage ...	Meeting points; arrangements for distribution and collection.
Captured areas	Administration of area; control of civilians; examination of water supplies; sanitary precautions; disposal of captured documents.

16. The following is a specimen message for transmission by signals in front of divisional headquarters:—

ARMY FORM C.2128.

MESSAGE FORM

CALL AND INSTRUCTIONS	IN	No. of Groups. GR.	Serial No. / OFFICE DATE STAMP
	OUT		

(ABOVE THIS LINE IS FOR SIGNALS USE ONLY.)

TO SALO GAMO rptd BONO LOPU KILU BOLO NEPA Q

FROM NILA | Originator's Number O 43 | Date 10 | In Reply to Number

ref	map	ALDERSHOT	command	one	inch
⊙	bridges	over	RIVER	BLACKWATER	between
incl	BLACKWATER	incl	EVERSLEY	will	be
prepared	for	demolition	forthwith	by	GAMO
assisted	by	working	party	SALO	ack
adrep					

THIS MESSAGE MAY BE SENT **AS WRITTEN** BY ANY MEANS.

SIGNED

IF LIABLE TO BE INTERCEPTED OR FALL INTO ENEMY HANDS, THIS MESSAGE MUST BE SENT **IN CIPHER.**

SIGNED **A. Smith Major**

ORIGINATOR'S INSTRUCTIONS DEGREE OF PRIORITY **IMPORTANT**

TIME OF ORIGIN. **1630**

T.H.I.

T.O.R.

(BELOW THIS LINE IS FOR SIGNALS USE ONLY.)

SYSTEM IN	TIME IN	READER	SENDER	SYSTEM OUT	TIME OUT	READER	SENDER	SYSTEM OUT	TIME OUT	READER	SENDER.

Note 1.—In the above example seven copies of the message would be passed to signals. The copy for Q, being for the use of another branch of the same staff, would be delivered direct, and "Q" would be struck out in the space "To" in the copies handed to signals.

Note 2.—In this specimen message code names are considered to have been allotted as follows:—

BONO	4 inf bde	GAMO	RE 2 div
SALO	5 inf bde	BOLO	1 div
LOPU	6 inf bde	NILA	2 div
KILU	RA 2 div	NEPA	3 div

Engineer services.	Provision of water facilities; special allotment of tools and engineer materials; location and stocks of reserves of engineer stores; provision and erection of sign-boards.
Medical services.	Location of regimental aid posts, advanced and main dressing stations, casualty clearing stations and ambulance railhead; location of collecting posts and car posts; arrangements for walking wounded; provision of additional stretchers; special sanitary precautions.
Ordnance services.	Railheads; location of ordnance field parks; position and allotment of mobile workshops; light aid detachments and L. of C. Recovery Sections; issue of any special stores or anti-gas appliances; arrangements regarding army and corps ammunition reserves.
Provost and traffic.	Traffic control; restrictions as to use of lights at night; collection and disposal of battle stragglers and prisoners of war; arrangements for dealing with refugees.
Supplies ...	Location and times for railheads; refilling points; meeting points; special issues; reserves; special arrangements for petrol; location of depots or temporary dumps.
Veterinary services.	Railheads; location of mobile veterinary sections and veterinary evacuation stations.

19. Page 205. Appendix VI, paragraph 3, table, column (*b*), line 1. *For* " 5 " *substitute* " 3 ".

APPENDIX VI

ROAD SPACE, DISTANCES AND PACE

1. The rates of movement for small bodies of troops in the field are approximately as follows :—

Arm	Yards a minute	Minutes required to traverse a mile	Miles an hour including short halts
(*a*)	(*b*)	(*c*)	(*d*)
Infantry—			
Usual pace ...	100	18	3
Mounted troops—			
Walk	117	15	3½
Trot	235	8	7
Gallop	440	—	—
Walk and trot ...	—	—	5

2. The normal speeds for armoured fighting vehicles are shown in Appendix I.

3. The rates of marching for transport on a level road are :

	Miles an hour	Number that pass a a given point in 10 minutes (single file)
(*a*)	(*b*)	(*c*)
Pack mules or ponies		250
Horsed transport or A.T. Mule Carts	2½	100
A.T. Bullock Carts	1½	60
Camels	2	100
Pack bullocks	2	160
„ donkeys	1½	—
Coolies	2	—

The above rates include short halts only, and may have to be halved on rough or hilly roads.

4. The space taken up in column of route by troops and transport is calculated as follows :—

Cavalry or mounted rifles in sections.	1 yard for each horse in the ranks.
Cavalry or mounted rifles in half-sections.	2 yards for each horse in the ranks.
Infantry in fours	1 yard for 2 men in the ranks.
Infantry in threes	2 yards for each 3 men in the ranks.
Cyclists in half-sections ...	1½ yards for each man.

Including distances.

Each pack animal (or pair) ...	4 yards
„ Camel (or pair)	5 „
„ 2-mule or pony vehicle ...	7 „
„ 1- or 2-horsed vehicle ...	10 „
„ 4-horsed vehicle or tractor, light, G.S.	15 „
„ 6-horsed vehicle	20 „
„ 8-horsed vehicle	25 „
„ 2-bullock vehicle (2-wheeled)	10 „
„ 4-bullock vehicle (2-wheeled)	15 „
„ 4-bullock vehicle (4-wheeled)	20 „

Actual length.

Each motor-car, van, motor ambulance or light trailer ...	6 yards
„ gun and tractor (Medium Artillery)	20 „
„ gun and tractor (Field Artillery)	13 „
„ omnibus	10 „
„ lorry or heavy trailer ...	8 „
„ tank or armoured car ...	6 „

5. The following distances will normally be maintained in column of route :—

i. In rear of squadron, horse-drawn battery, infantry company or equivalent unit	10 yards.
„ cavalry regiment, horse-drawn artillery brigade or infantry battalion ...	20 „
„ cavalry or infantry brigade	30 „

ii. *Mechanically drawn artillery and armoured fighting vehicles.*

	Distance to be maintained	
	On the move	At the halt
(*a*)	(*b*)	(*c*)
R.A.		
Between vehicles	20 yards	2 yards
„ sections	40 „	20 „
„ batteries or brigades ...	40 „	20 „
R.T.C.		
Between tanks (all natures) ...	25 yards	10 yards.
„ sections	50 „	50 „
„ companies	50 „	50 „
„ battalions	100 „	100 „
iii. *Mechanical Transport in convoy.*		
Between vehicles	20 yards	2 yards
„ blocks	40 „	20 „

6. The road space occupied by various units on the move and at the halt is given in the Field Service Pocket Book.

APPENDIX VII

SUITABLE TABLES FOR MARCHES AND TROOP MOVEMENT BY RAIL AND MECHANICAL TRANSPORT

Specimen March Table

Secret.
Copy No.....

Appendix.....to.....Operation Order No.....

Serial No.	Date	Unit	Place		Starting point	Time	Route	Remarks
			From	To				
	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)	(*g*)	(*h*)

NOTES

1. Each unit, or formation, is given a serial number to allow of easy future reference; columns in the Table are lettered for the same purpose.
2. Any necessary instructions for the march which are not given in the operation order should be shown in column (*h*) (Remarks).
3. For explanation of starting point, *see* Sec. **21**, 5.
4. It is unnecessary for times (*i.e.* times of passing starting point) to be more accurate than the nearest minute. Allowance for the halt of 10 minutes before each clock hour should be made in calculating times.
5. It is not always necessary to complete all the columns of the Table.

APPENDIX VII—*continued*

Specimen Bus Table

Secret.
Copy No.....

Appendix.....to.....Operation Order No.....

Serial No.	Unit Group commander (*See* Note 1)	Unit	Bus (or lorry numbers). (*See* Note 2)	Bus (or lorry loads)		Total of unit	Embussing point	Time troops due at embussing point	Route to embussing point	Time of start	Remarks
				Personnel	Stores						
	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)	(*g*)	(*h*)	(*j*)	(*k*)	(*l*)

NOTES

1. Troops embussing are organized into unit groups. When the troops are required to debus in proximity to the enemy, the composition of transport columns should be arranged so as to preserve the tactical organization of the troops moved; otherwise the composition of unit groups should be designed to avoid breaking up the organization of transport units. A unit group may therefore consist of a unit or portion of a unit, or may comprise portions of two or more units. Each unit group is allotted a serial number in the Table, and its commander detailed in column (*a*).
2. The buses or lorries in the transport column are numbered consecutively throughout, and the numbers allotted to each unit group are shown in column (*c*); spare buses or lorries are unnumbered.
3. The exact detail of stores to be embussed must be shown in column (*e*).

APPENDIX VII—*continued*

Secret.
Copy No.....

Specimen Entrainment Table

Appendix.....to.....Operation Order No.....

Train No.	Serial No. (*See* Note 1)	Unit (or portion of Unit)	Entraining point	Train ready to load		Departure		Detraining point (*see* Note 3)	Train due to arrive		Remarks
				Date	Time	Date	Time		Date	Time	
(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)	(*g*)	(*h*)	(*j*)	(*k*)	(*l*)	(*m*)

NOTES

1. Each unit (or portion of a unit entraining separately from its parent unit) is given a serial number (*see* Manual of Movement (War), 1933, Sec. 86, 5).

2. This form is adaptable to all types of troop movement by rail. In strategic movements (*see* Sec. **26**), units normally entrain complete except for M.T. vehicles, which when possible move by road. In tactical movements, units usually entrain with a minimum of transport; and additional columns should be interpolated after column (*c*) giving the entrainment strength of units in :—

i. Officers.
ii. Other ranks.
iii. Animals by types.
iv. Horse drawn vehicles by types (the actual vehicles to entrain being specified).
v. When applicable, M.T. vehicles or A.F.Vs. by types.

3. For reasons of secrecy it may be considered advisable to omit all references to detraining points, but, when this is not essential, the information assists supply and maintenance arrangements.

APPENDIX VIII

BRIDGES AND FORDS

1. *Classification of loads.*—In order to simplify bridging problems, military loads are divided into the following groups :—

i. *Assault.*—Infantry in single file.

ii. *Pack.*—Infantry in file; cavalry in single file; pack transport (including mountain artillery).

iii. *Light.*—Infantry in fours; cavalry in half-sections; vehicles and weapons with forward units. Includes horsed transport; horse and field artillery (horse or tractor drawn); motor cars; vans; ambulances; 30-cwt. lorries; all ordinary M.T. vehicles and armoured cars up to a maximum axle load of 3 tons for 4-wheelers and 1·75 tons or 3·5-ton rear bogies for 6-wheelers; light dragons, tractors and other tracked vehicles with sprung tracks and not exceeding 4½ tons total weight.

iv. *Medium.*—All loads normally with a division. Includes all ordinary 4-wheeled M.T. vehicles up to an axle load of 5·7 tons; all ordinary 6-wheeled M.T. vehicles up to an axle load of 3·6 tons or a rear bogie of 7·2 tons; all tracked vehicles with sprung tracks and not exceeding 9 tons total weight.

NOTE.—Medium artillery and anti-aircraft guns on 4-wheeled trailer platforms are excluded on account of the weight of the tractor used to draw them.

v. *Heavy.*—All loads normally with an army in the field. Includes all 4-wheeled M.T. vehicles; 6-wheeled M.T. up to an axle load of 8·25 tons or a bogie load of 16·5 tons; tracked vehicles with sprung tracks and up to 19·25 tons in weight provided that the track bearing length is not less than 13 feet.

vi. *Super-heavy.*—Vehicles whose weights exceed the limits of the heavy load class.

Vehicles of unusual design, such as those with an exceptionally short wheel base or short track length, are not covered and must be considered individually for classification.

It is essential that normal loads of vehicles as laid down from time to time are not exceeded. This is primarily the responsibility of unit commanders, but attention should be drawn to this point in orders and instructions whenever a bridging operation is contemplated.

2. *Classification of bridges.*—Military bridges are classified in accordance with their capacity to deal with the above load groups. They comprise the following :—

i. *Mobile bridging equipment*, i.e. equipment designed to meet tactical requirements and provided with its own transport.

Load classification	Type of equipment	Purpose
(*a*)	(*b*)	(*c*)
Assault.	Kapok. Folding boat.	For slow running streams not exceeding some 150 ft. in width. As single boat ferries carrying 25 armed men and crew of 5.
Pack.	No special equipment is provided ; as a rule the light bridge will suffice.	—
Light.	Folding boat.	As tracked rafts for the passage of infantry first line transport vehicles, provided these do not exceed 3 tons in weight : tracked rafts will not take horses, so that horsed vehicles must be manhandled on to the rafts and the horses put across by swimming or other means. As decked rafts working between piers : as a bridge.
Medium.	Small box girder. Pontoon and trestle.	For spans of 32, 48 and 64 ft. As rafts or in bridge.
Heavy.	Pontoon and trestle.	As rafts or in bridge.

6. Page 212. Appendix VIII, paragraph 1.—*Add* :—

Tracked vehicles should normally cross mobile equipment bridges at a crawl, and certain vehicles of wide wheel track may require guiding to obviate the risk of the bridge ribands being seriously damaged.

20. Appendix VIII.

Page 212. Paragraph 2, i, Table, Column (a). *Insert* an asterisk against "Light" and *add* as footnote:—

* With the latest type of light bridge (1936) tracked vehicles not exceeding five tons total weight can be carried.

Page 213. Paragraph 3, i, Table :—

Column (a). *Delete* "Pontoon Bridge Park, R.A.S.C." and *substitute* "Bridge Company, R.A.S.C."

Columns (c) and (d). *Delete* "1 Bridge per cav. div." in each case.

ii. *Temporary bridging equipment*, i.e. equipment for rapid erection in forward areas with a view to replacement of mobile bridging equipment when the latter has to be replaced and the crossing has to remain in operation. This equipment is not permanently provided with transport but is easily transportable in normal types of army vehicles.

iii. *Semi-permanent bridging equipment*, i.e. standardized equipment for building up on the site. Primarily for use in rear areas and transportable in the vehicles that can be employed there.

3. *Provision of bridging equipment.*—

i. *Mobile bridging equipment* is carried in the field as follows:—

	Kapok	Folding boat	Small box girder	Pontoon and Trestle
(*a*)	(*b*)	(*c*)	(*d*)	(*e*)
Field Squadron R.E.	—	1 cav. set	—	—
Field Park Coy. R.E.	—	2 inf. sets	2 bridges	—
~~Pontoon Bridge Park, R.A.S.C.~~ 2 (1937).	108 bays per div.	1 cav. set per cav. div. 1 inf. set per div.	1 bridge per cav. div. 1 bridge per div.	38 medium bays or alternatively 25 heavy bays of which, in each case, 12 are trestle bays and the remainder are pontoon bays.

ii. *Temporary and semi-permanent bridging* will be held in engineer parks and base depots.

4. *Details, transport and uses of mobile bridging equipment.*—

i. *Kapok.*—The bay is 6 ft. 6 in.; the transport unit is 27 bays carried in one 30-cwt. lorry with one 15-cwt. trailer.

ii. *Folding Boat.*—

Composition of sets and units. (*a*)	Transport (*b*)
Cav. Set.—4 boat units and 2 trestle units. Inf. Set.—2 raft units, 1 boat unit and 1 trestle unit. Raft Unit.—3 boats with superstructure for 1 tracked raft and 1 floating (or half floating) bay. Boat Unit.—3 boats with superstructure for 2 floating (or half floating) bays. Trestle Unit.—2 trestles, 2 bays of trestle superstructure and 2 shore bays.	The raft and boat units are each carried in one 3-ton 6-wheeled lorry with 4-wheeled trailer and the trestle unit in one 3-ton 6-wheeled lorry *Demands on the Pontoon Bridge Park should be in terms of transport units and not by sets.*

Notes.—1. Each "cavalry" set of folding boat equipment will make 172 ft. of bridge, plus 34 ft. of trestle bridge. The cavalry set is capable of division into two equal parts, each making 112 ft. of bridge.
2. Each "infantry" set of folding boat equipment will make 112 ft. of bridge, plus 1 tracked raft, plus 1 spare boat. Two infantry sets combined will make 192 ft. of bridge, plus 2 tracked rafts, plus 34 ft. of trestle bridge.

iii. *Small Box Girder.*—The complete bridge (64 ft.) is carried in three 3-ton, 6-wheeled lorries.

iv. *Pontoon and Trestle.*—The bay is 21 ft. The equipment comprises 25 pontoon units, 12 trestle units, 6 odd bay units, 3 conversion units with 2 cut bay units: each unit is carried in one 3-ton 6-wheeled lorry, pontoon units having in addition a 4-wheeled trailer.

(*a*)	Composition of units. (*b*)
Pontoon unit.	1 medium pier of 2 pontoons and 1 bay of medium superstructure.
Trestle unit.	1 trestle and 1 bay of heavy superstructure.
Odd bay. unit.	1 bay of medium superstructure and 2 heavy shore bays.
Conversion unit.	Compound joists for 4 heavy piers.
Cut bay unit.	Roadbearers and ribands for 2 cut bays (heavy bridge).

USE OF PONTOON EQUIPMENT

The equipment with a pontoon bridge park is sufficient for:—

(*a*) Medium bridge—a combined pontoon and trestle bridge of 798 ft.

(*b*) Heavy bridge—a combined pontoon and trestle bridge of 525 ft.

NOTES.—(1) Combination of trestles and pontoons is dependent upon depth of water, etc., local conditions will, as a rule, impose some limitations upon the use of one or the other.

(2) Rafts, medium and heavy, can be made with the pontoon equipment.

5. *Fords*—The following depths are fordable:—

	ft.	in.
Cavalry	4	0
Infantry	3	0
Tanks, medium, light, Armoured cars } *See* Appendix I		
Tractors and horsed vehicles	2	6
Lorries and heavy ambulances	2	0
Motor cars	1	6
,, cycles	1	0

Gravelly bottoms are best; sandy bottoms are bad, as the sand gets stirred up, thus increasing the depth of water.

The depth of a river is generally most uniform in straight parts; at bends the depth will generally be greater at the concave bank and less at the convex. For this reason a river which is not anywhere fordable straight across may be found passable in a slanting direction between two bends.

All fords should be clearly marked by strong pickets driven into the river bed above and below the ford, their heads being connected by a strong rope. Marks should be made on those pickets which stand in the deepest water, at a height of 3 feet and 4 feet above the bottom, in order that any rise of water above the fordable depth may at once be evident.

6. Detailed information about swimming horses will be found in Cavalry Training.

APPENDIX IX

HEADINGS FOR RECONNAISSANCE REPORTS

The following are given as a guide to the points to be considered in furnishing reports :—

Aerodrome (or Landing ground)—Concealment from the air (e.g. proximity to rivers, roads or other prominent features); surface (nature, whether sufficiently level and firm, slope and drainage, estimate of work required to level or remove obstruction); area (clear run of 600 yards required in principal landing direction, which should preferably be that of the prevailing wind) shape (giving points of compass); air approaches and obstructions to landing and taking off (e.g. trees, telegraph wires, buildings); ground approaches (i.e. accessibility for M.T., etc.) and communications; accommodation for personnel; water supply; any special local meteorological conditions (e.g. prevailing wind, liability to mist or fog).

Armoured troops—Nature of country (as affecting cross-country movement), obstacles (woods, streams, marches, hedges), defiles (including towns and villages), capacity of bridges, gradients, nature of soil, effect of rain; lying-up areas (capacity, concealment from air, protection); supplies of petrol and oil.

Attack—Extent of enemy position, location, and strength of flanks; topographical weaknesses (e.g. defective field of fire, lack of depth, exposure to observation, etc.); enemy dispositions (guns, machine guns, anti-tank weapons, facilities for observation, cover for reserves, likely positions for tanks etc.); entrenchments and wire, obstacles; lines of attack most favourable to co-operation between the arms; forming-up places; dead ground; observation posts; artillery positions; suitability of ground for tanks; best positions for headquarters and lines for signal communications; suitability of ground and roads for administrative arrangements, etc.

Billets—Capacity of town or village for men, animals, and vehicles; alternative approaches (to avoid congestion); water supply for men, watering places for animals; positions for headquarters; assembly places; cover from air observation; cover from bombardment (in cellars, etc.); parking places for armoured fighting vehicles, guns, and vehicles.

Bivouac (or camping ground)—Extent, nature of ground, shape, facilities for drainage, approaches, defensibility, cover from air observation, water supply, fuel, forage.

Bridge—Material (steel, stone, brick, wood), span, number of arches or piers, dimensions, height above water, rail, or road, load taken, nature of river or stream (width, depth), materials available for repair, defensibility. (A figured hand-sketch is useful.)

Camp—see Bivouac.

Canals—Depth, width, nature of banks and of bottom; locks, bridges, suitable crossing places; boats or barges.

Country—Flat, undulating, hilly, open or enclosed, cultivated or not; nature of soil; town, villages, farms, number of inhabitants; water supply; communications (railway, road, telegraph); defiles, rivers, streams, bridges; landmarks, observation points; supplies, forage, petrol, oil; suitability for movement of all arms (including armoured units).

Defensive position—Extent, depth, and nature; best positions for flanks; facilities for observation of enemy and concealment of own troops (including reserves); field of fire; observation available for enemy; strong and weak points; facilities for surprise; covered ways within the position; advanced posts; artillery positions; ground suitable for tanks; nature of soil for entrenchment; natural obstacles (especially against armoured fighting vehicles); wire and other materials available locally; villages and buildings and suitability for defence; covering or outpost position; best line for counter-attack; suitability of ground and roads for administrative arrangements, water supply, etc.

Defile—Nature, whether commanded by neighbouring ground, length, width, ground on near and far side, positions for flanking parties, exposure to air attack.

Ford—Depth, nature of bottom, distance across, whether straight or slanting, methods of marking or recognizing ford, nature of banks, approaches, ground on either side, defensibility.

Landing ground—see Aerodrome.

Observation post—Nature (hill, tower, tree, haystack, building, etc.), extent of view (a panorama sketch may be useful), cover available, nature of approaches (i.e. road, path, etc.), and whether concealed or not.

Railway—Gauge, number of lines, weight of rail, sleepers (wood or iron), nature of ballast; embankments, cuttings, tunnels, bridges, steep gradients; description of station; approaches and forming-up places (area, water supply, latrines and urinals, etc.), passenger and goods sidings (number, length, and road access), platforms (number, length, breadth, and height), number of end-loading and other ramps, facilities and area available for extension of station yard, goods sheds, engine sheds, locomotive turning arrangements; water supply; lighting arrangements; office accommodation, etc.

River—Depth, width, current, nature of banks, nature of bottom, bridges, fords, ferries, facilities to swim horses, watering places, boats, material for rafts, liability to flood, etc.

Road—Nature, condition of surface, width, metalling, steep gradients; bridges (load carried), suitability for M.T.; fenced or unfenced, nature of ground on either side; defiles; points of tactical importance; liability to traffic congestion, points where traffic control required, turning places or circuits for M.T.; exposure to air observation; places for watering men and animals; telegraph and telephone lines; proximity of materials for repair.

Station—see Railway.

Towns or villages—Length, width, shape, number of inhabitants; material of buildings; facilities for billeting; defensibility; water supply; means of lighting (electricity, gas, lamps); supplies of food, forage, oil, petrol; parking places, traffic control arrangements; local administration (names and addresses of chief civil functionaries, etc.

Water supplies—From stream, pond, or well; flowing or stagnant; yield in gallons an hour; number of animals that can drink at one time; fitness for men's drinking.

APPENDIX X

OUTLINE OF POINTS REQUIRING CONSIDERATION IN DRAWING UP SCHEMES FOR ANTI-GAS DEFENCE

(NOTE.—The headings given below apply especially to schemes for the protection of establishments at the base and on the lines of communication; but schemes on similar lines may be required in camps or billets in the forward area. All schemes should be prepared in close liaison with the local civil authorities and other fighting services in the area concerned. For further details, *see* Manual of Defence against Gas.)

1. *Nature and scale of attack to be expected.*
2. *Organization.*
   - i. Division of area into sub-areas.*
   - ii. Location of headquarters and system of intercommunication.
   - iii. Provision and organization of personnel for special duties, e.g. gas sentries, decontamination squads. (Details and orders for various groups should be included in appendices.)
3. *Defence measures.*
   - i. Special instructions for the protection of personnel manning anti-aircraft weapons.
   - ii. *Sentries or lookouts.*—Location of posts; issue and care of detector discs. Orders for sentries.
   - iii. *Alarm posts, shelters, and undressing stations.*—Locations; capacity and type of shelters (e.g. gas-proof refuges); detail of personnel for work in undressing stations.
   - iv. *Warning.*—Arrangements for receipt and circulation. Action to be taken by all concerned.

* Boundaries should not differ from those laid down for other purposes.

v. *The alarm signal.*—Authority for ordering the alarm to be given. Action to be taken by all concerned.

vi. Coverings for unprotected stores.

vii. Provision and location of fire-fighting squads and equipment.

4. *Action during and after an attack :*

i. Control of personnel. Location of police posts and action.

ii. Reports to superior commander as to the nature and extent of attack.

iii. Reconnaissance by sub-area commanders to ascertain extent and degree of damage or contamination and its effect on other sub-areas, e.g. wind carrying vapour from a grossly contaminated area.

iv. Arrangements for marking contaminated areas.

v. Orders for giving the " all clear " signal, or for total or partial resumption of normal activities.

5. *Medical.*—First aid. Reception and evacuation of casualties.

6. *Decontamination.*—Arrangements for inspection and decontamination or disposal of :

i. Personnel.

ii. Clothing.

iii. Buildings, tents, etc.

iv. Areas grossly contaminated.

v. Stores for which the unit or establishment is responsible.

7. *Stores.*—Issue of clean clothing in place of that contaminated. Details of special stores held, place of storage, arrangements for issue and transport.

INDEX.

A.

ARMY FORM C.2128.

MESSAGE FORM

CALL AND INSTRUCTIONS.	IN	No. of Groups. GR.	Serial No.
	OUT		OFFICE DATE ST

(ABOVE THIS LINE IS FOR SIGNALS USE ONLY.)

TO SALO .GAMO repeated BONA. LOPU KILU BOLO NEPA Q

FROM NILA | Originator's Number 0 43 | Date 10 | In Reply to Numbe

Ref	map	ALDERSHOT	command	one	inch
⊙	bridges	over	BLACKWATER	RIVER	between
incl	BLACKWATER	incl	EVERSLEY	will	be
prepared	for	demolition	forthwith	by	GAMO
assisted	by	working	party	SALO	⊙
ack	adrep.				

THIS MESSAGE MAY BE SENT AS WRITTEN BY ANY MEANS.

IF LIABLE TO BE INTERCEPTED OR FALL INTO ENEMY HANDS, THIS MESSAGE MUST BE SENT IN CIPHER.

ORIGINATOR'S INSTRUCTIONS DEGREE OF PRIORITY: IMPORTANT

TIME OF ORIGIN: 1630

SIGNED A.Smith Major

SIGNED

(BELOW THIS LINE IS FOR SIGNALS USE ONLY.)

SYSTEM IN	TIME IN	READER	SENDER	SYSTEM OUT	TIME OUT	READER	SENDER	SYSTEM OUT	TIME OUT	READER	SENDER

T.H.I.

T.O.R.

21. Page 222. *For* " Air force contingent " *substitute* " Air force component ".

B.

C.

D.

E.

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