MACHINE-GUN TACTICS

BY

CAPTAIN R. V. K. APPLIN

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Title: Machine-Gun Tactics

Author: R. V. K. Applin

Release date: September 14, 2021 [eBook #66305]
Most recently updated: October 18, 2024

Language: English

Other information and formats: www.gutenberg.org/ebooks/66305

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BY

CAPTAIN R. V. K. APPLIN, D.S.O.

14th (King's) Hussars

LONDON

HUGH REES, LTD., 119 PALL MALL, S.W.

1910

PRINTED BY
HAZELL, WATSON AND VINEY, LD.,
LONDON AND AYLESBURY.

PREFACE

This book, which was begun five years ago, is now published because I feel that, with all its faults, it may bring into greater prominence the latent possibilities of the machine gun, and the vital necessity for the most complete organisation and tactical training of the detachments.

I desire to express my great indebtedness to Captain C. O. Place, D.S.O., Royal Engineers, who undertook the work of editing and preparing the book for the press at a moment's notice on my sailing for India.

R. V. K. APPLIN.

R.I.M.S. "NORTHBROOK,"
December 1st, 1909.

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ERRATA

Error	Page	Line	Correction
“firing”	4	20	finding
“to”	6	4	delete
“short”	27	17	shorter
“25”	35	20	125
“G to O”	53	9	O to G;
“VIII”	65	26	I
“training”	72	1	turning
“distance”	116	5	distant
“work.”	160	1	works
“the”	163	2	delete (*i.e.* “attack in mass”)
“portable”	174	28	potable
“line” (omitted)	177	27	insert word “line” after “blockhouse”
(Sentence wrong)	179	27	“an event which has happened almost every decade.”
“1 ft.”	196	22	1 ft. 6 in.
“natural”	221	5	mutual
“gear”	226	15	gun
“ground”	”	19	gun
“screen”	227	13	screw
“it placed”	231	12	is

“attacked”	238	8	attached
·26	251	3	·256
“strap”	252	5	strip

MACHINE-GUN TACTICS

CHAPTER I

DESCRIPTION AND ORGANISATION

The modern machine gun is essentially an automatic weapon of small-arm calibre, capable of firing from 100 to 600 shots a minute from a light mounting of extreme mobility, and should fulfil the following qualifications:

1. It should be able to deliver about 400 shots a minute without loss of accuracy, even with prolonged “continuous” firing.

2. It should be capable of accompanying cavalry and infantry wherever these arms can go; it should occupy the smallest space, and be able to come into action quickly at rifle range.

3. It should have a firm mounting, upon which the gun is steady, and from which it can be aimed rapidly and fired while kneeling, sitting, or lying.

4. The gun and its mounting must present a small target, and be light enough for each, and if possible, both, to be carried by one man for a considerable distance, and should admit of being dragged by a man crawling or crouching for short distances.

5. It should be in constant readiness for action, and

able when limbered up to open fire in less than thirty seconds.

6. It should be simple, strong, and durable. Mobility and constant readiness for action are indispensable with cavalry, while lightness and smallness of target are essential factors.

There are eight main types of machine guns at present in use in the armies of the world, viz.:

Gun.	In use in
Maxim	Great Britain, Germany, Russia, Italy, Portugal, Turkey, Switzerland, and U.S.A.
Hotchkiss	France, Japan, Belgium, Norway, Sweden, Spain, and Portugal.
Perino	Italy.
Puteaux	France.
Schwarzlose	Austria.
Skoda	Japan and China.
Madsen	Russia, Denmark (Rekyl pattern), and China (for cavalry).
Colt	By several countries in addition to adopted gun.

The principal differences between these guns are: (*a*) The automatic mechanism. (*b*) Method of loading.

(*a*) may be divided into two classes: 1. *Recoil action*—the Maxim, Perino, and the Madsen. 2. *Gas-pressure action*—the Schwarzlose, Hotchkiss, Skoda, and Colt.

(*b*) consists of three classes: 1. *Belt loaders*—the Maxim, Schwarzlose, and Colt. 2. *Metal clip loaders*—Hotchkiss, Madsen, Perino, and Puteaux. 3. *Hopper loaders*—the Skoda.

Several of the above countries—notably Russia, Japan, France, and Austria—have more than one pattern of gun in their service, and it is difficult to

say which they intend finally to adopt; but Russia, since the war, has ordered several thousand Madsen guns, and Japan is said to be trying this gun, one of which during the war fired 25,000 shots in a single day.

The Rexar gun has been purposely omitted; it only weighs 17½ lb., but is fired from the shoulder, and is therefore more of the nature of an automatic rifle than a machine gun. It would take too long to deal with each of these weapons separately, therefore the Maxim has been selected as the type with which to discuss the question of tactics.

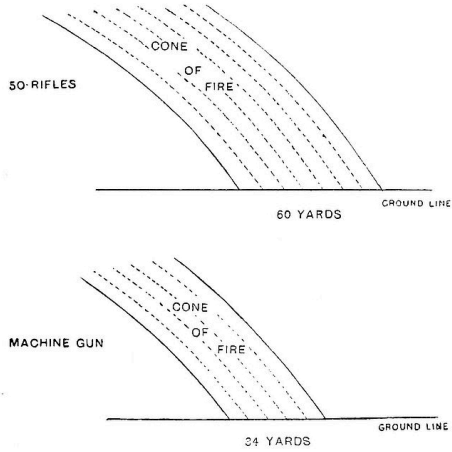
In order thoroughly to understand the methods that should govern the tactical employment of machine guns, and their place in the battlefield, it is first necessary clearly to realise their nature and potentialities, and for this purpose we will examine their principal characteristics. Guns of this class are capable of firing service small-arm ammunition at the rate of 800 shots in one minute, but this very high rate of fire is obviously undesirable for several reasons—the principal, from a military point of view, being that, however skilfully the gun is handled, a great waste of ammunition must ensue, and hundreds of shots be wasted in space, however accurate the fire. These guns are, therefore, regulated to fire at a maximum rate of from 400 to 500 rounds a minute, or seven to eight shots a second, but even this is greater than is necessary to obtain the maximum fire effect; at ordinary targets 100 to 250 rounds a minute, according to the nature of the target, has been found to give the best results in practice. The “rate of fire” of a gun must not be confused with the number of rounds that can be fired from it effectively in one minute; the necessity for

frequent pauses to observe the effect, to correct the elevation and direction of the fire, prevent a greater number than from 150 to 250 shots being fired effectively in one minute from a gun whose rate of fire is 450 shots a minute. Colonel Mayne, in his book *The Infantry Weapon and its Use in War*, says: "The machine gun now in use can fire about 600 rounds a minute, or ten a second. This is a far greater rapidity of fire than is really necessary, for it means that a man or horse is struck several times before falling. It is a good thing to be able to fire 600 rounds a minute on occasions (such as for range finding), but a far slower rate of fire (say 100 rounds or even less a minute) is ample for all ordinary tactical purposes against living beings and animals, whilst causing an enormous saving of ammunition."

The extreme range of this type of gun is for all practical purposes the same as the infantry rifle—about 3,500 yards—though it is more effective at the longer ranges than an equal volume of rifle fire, owing to the ease with which the firer can elevate and aim the gun on its mountings and the stability of this mounting, which causes it to have a beaten zone of only half the depth and nearly half the width of that of infantry firing the same number of rounds. This has been proved again by actual experiment at the schools of musketry in England, India, and South Africa, while very elaborate experiments and trials carried out in Germany with the Maxim gun on the carriage adopted for that service proved that the beaten zone was only one-sixth of that obtained by infantry, probably because of the greater stability of their mounting.

DIAGRAM I

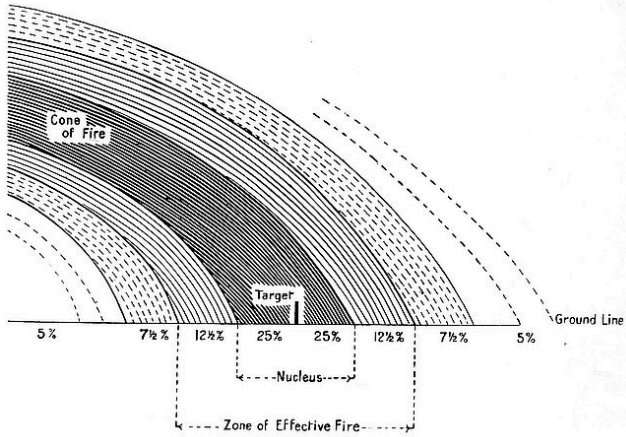
TO SHOW THE ZONE BEATEN BY 50 PER CENT. OF BULLETS



In order that “fire” may be “effective,” it is necessary to bring the enemy within the zone beaten by 75 per cent. of shots, and it has been found by experiment that 25 per cent. of shots fall immediately in front and behind the target, then 12½ per cent., 7½ per cent., and, finally, 5 per cent. scattered far in front and behind.

DIAGRAM II

TO SHOW THE DISPERSION OF BULLETS



Infantry usually fire at the rate of three rounds a minute "slow," and fifteen rounds a minute "rapid"; "slow" fire is the ordinary rate, and "rapid" fire can only be effectually maintained for about four minutes; but this is when the firer is fresh, and has not been subjected to several hours' marching and fighting as would be the case in battle, and it is doubtful if "rapid" fire can be kept up on service for more than one-and-a-half to two minutes without becoming wild and consequently ineffective. On the other hand, "rapid" fire is less tiring to the machine gunner than "deliberate" fire; the gun is held for him by the mounting, it loads and fires itself, while elevation and direction are maintained without the least exertion on his part by the elevating and traversing gears.

In comparing the volume of fire of the machine gun with that of a body of infantry, it is obvious that "rapid" cannot be taken as the normal rate of infantry fire, as it can only be used for the shortest periods, and even then it reduces the users to a state of inefficiency as regards accuracy in two or three

minutes. On the other hand, “rapid” fire can only be used by the machine gunner on special occasions, for tactical reasons which will be explained later, so that it will be necessary to compare “slow” infantry fire with “deliberate” fire from the machine gun, in order to arrive at the mean fire volume of each. Seventy shots a minute can easily be fired “deliberately” from a machine gun, and this could be increased to 120 by highly trained gunners, but, taking the lower figure, deliberate fire equals in volume the fire of twenty-four men using rifles. But it must be always remembered that the object of the fire fight is to bring a concentrated and overwhelming fire to bear *at the right moment* on certain positions of the enemy, and when the moment arrives machine guns can and will use the most rapid rate of fire possible, which will be from 250 to 300 rounds a minute or equal to that of 50 or 100 riflemen. Mere volume of fire, however, is useless without control, accuracy, and concentration, and it is here that the machine gun is so vastly superior to the rifle; for amongst 50 men using their rifles there can only be a small percentage of good shots, while even among the good shots unforeseen factors, such as fatigue, bad fire positions, excitement, wrong sighting, failure to see the target, etc., cause a large percentage of the shots to go astray, and make it very difficult to concentrate the fire on any particular position of the enemy.

An object-lesson to illustrate this superiority of the machine gun has been carried out during each course at the South African school of musketry under circumstances most favourable to the rifles. The record of one such test, carried out on September 21st, 1904, between a Maxim gun mounted on Mark III. tripod and 42 rifles (Lee Enfield), was published.

The machine gun was worked by two sergeant-instructors, while the 42 rifles were fired by students who were all, at least, 1st Class shots before joining the school, and who for five weeks had been receiving daily instruction in musketry, and had just completed a course of firing both on the ranges (Table B) and in field-firing, and had gone through a course of judging distance. The range was unknown —the number of rounds unlimited, and the rate of fire "rapid." The time was limited to one minute, and the firers were allowed to charge their magazines before starting. The targets were figures representing infantry in line extended to two paces. The following was the result:

	Rounds fired.	Hits.	Percentage.	Figures hit.	Percentage of loss.
Rifles	408	62	15·1	27	54
Maxim	228	69	30·2	32	64

The small number of rounds fired by the Maxim was due to the necessity of picking up the range by firing small groups of five or ten shots and observing the strike of the bullets. What is most interesting is that although the rifles fired nearly twice as many shots as the machine gun, the latter made actually more hits, while the percentage of loss inflicted was 10 per cent. greater. The actual range was 1,000 yards. A similar experiment was carried out during the annual training for 1908 in the U.S.A. between 42 "sharpshooters" and a Maxim at the regulation "L" target. The ranges were 600, 800, 1,000 yards; the sharpshooters fired an average of 750 rounds at the three distances and made an average of 429 hits, which gave a collective figure of merit of 59·09. The machine gun also fired 750 rounds, made 601 hits, giving a collective figure of merit of 79·54, being 22·45 in favour of the machine gun. The troops were

armed with new rifles, and fired the new “S” bullet, while the machine gun used the old pattern ammunition and a barrel that had fired at least 7,000 shots. The gun squad had no previous practice at this target, and the gun was fired by different men at the several ranges. The collective fire of the troop was “slow aimed,” while the fire of the machine gun was “rapid continuous” for the number of rounds at each range. The machine gun took 30 seconds to fire 250 shots at each range, or a quarter that of the troop.[1]

The two experiments are particularly interesting, as showing how closely the results agree, although the conditions are dissimilar in one respect: viz. that in the first case the number of rounds was unlimited and the result had to be obtained within one minute; while in the second case time was unlimited, but the number of rounds fired by each was the same. The result of the two experiments show that both in accuracy and rapidity a machine gun is much superior to 42 picked shots, whether firing the same number of rounds at known ranges or firing an unlimited number of shots in a given time at an unknown range. We shall not be wrong, then, if we say that a machine gun is at least equal to 50 rifles in fire value,[2] but there are other factors to be considered as well as fire effect in determining its tactical value, and it is in these other factors that machine guns are so far superior to riflemen as to make a reliable estimate of their relative value almost impossible; these factors are: (1) Mobility; (2) Visibility; (3) Vulnerability.

Mobility.—The mobility of the infantry soldier is limited to the rate at which he can march, which on the battlefield is about 100 yards a minute or less than three-and-a-half miles an hour. Doubling may

be left out of the question, as it quickly reduces fire efficiency to a minimum. An experiment made in the Austrian Army showed that the percentage of hits which was 76·5 per cent. after an advance in quick time, fell to 51 per cent. after doubling.[3] The mobility of the machine gun will depend almost entirely on the way it is carried, and must not be judged by any particular carriage which may happen to be in use for the time being in our own service. A short description of these mountings and their method of transport will be found in Chapter IX., but none of them are entirely satisfactory.

The infantry carriages are heavy, clumsy, and conspicuous, and are the least mobile of all; they can hardly be moved out of a walk without risk, and Marks III. and IV. cannot come into action without first unharnessing the mule or horse, and they then have to be dragged into position by the whole detachment—thus presenting a most conspicuous and vulnerable target at the moment when least desired and when concealment and invisibility are essential to tactical success.[4] In the German Official Account of the late Boer War, issued by the General Staff, is the following criticism of this carriage:

"Both sides have machine guns, but the rather clumsy mountings of those used by the British offered too high a target, and so prevented their being advanced from position to position during the attack."

The tripod mounting, which is light and inconspicuous, is carried with the gun on a limbered wagon; but the advantages of its lightness and portability are almost neutralised by being carried on a wagon, thus reducing its mobility by confining it to ground suitable for wheeled vehicles.

If used on a pack-saddle the difficulty of managing a led animal on foot in the stress of battle may become insuperable, and moving the gun in and out of action is entirely dependent on the docility of the pack-animal. The gun weighs anything from 40 to 60 lb., while the mountings need not weigh more than 34 lb. The combined weight of a gun and mounting should never exceed 120 lb. and can be as little as 74 lb.

In whatever way it is decided to carry the gun, it is a *sine quâ non* that it must be at least as mobile as horse artillery. There is no reason why it should not be as mobile as cavalry, and the choice remains between a pack-horse with a mounted detachment or a galloping carriage; and the former is in every way preferable, principally because it can carry the gun and ammunition across any country, and can come into action in less than 30 seconds on an adjustable tripod, which can be carried by hand into any position and presents a very small, inconspicuous target.

The majority of foreign countries have adopted pack transport for their machine guns. It is desirable with infantry and absolutely essential with cavalry. A suitable saddle is, of course, indispensable, and strong spiral springs to the hooks which hold the gun and tripod on either side will entirely prevent horses from straining their backs when galloping across country or jumping obstacles with the guns. These hooks must be leather-covered and made to fit the gun exactly, and, in order to do away with the present cumbersome straps and buckles, they should have a hinged attachment to close over the gun and lock automatically in such a way as to admit of its being opened by a single movement when it is

required to dismount the gun. The Swiss and the Americans have permanently adopted pack transport for the machine guns with their cavalry, which are able to accompany them over any country without detriment to either horses or guns; and in the American army the average time for a well-trained cavalry machine-gun detachment to go into action front, from mounted formation, unpack, and set up the guns, load, aim, and open fire, is 25 seconds; while at the departmental meeting for 1908 the machine guns of the 10th Cavalry, from the halt in line, *moved forward in section column at a gallop for 200 yards and went into action and fired a blank shot in 31 seconds*.[5]

This brings us to the second factor—*Visibility*. It is absolutely necessary for the successful tactical employment of machine guns that they should be as inconspicuous as possible when in action; the gun itself is a very small object when close to the ground, and its visibility will depend almost entirely on the nature of mounting and its adaptability for use behind cover of varying heights. All our infantry carriages are so conspicuous as to be quite unconcealable except in defence, the wheels being 4 ft. 8 in. in diameter and the gun axis 3 ft. 6 in. above the ground. The Mark IV. tripod is the handiest and least conspicuous of the mountings at present in use in our service, and although it weighs 48 lb. it can be carried into almost any position and easily concealed. It can be adjusted to fire at any desired height between 14½ and 30 in. above the ground level, and consequently can be used from behind any suitable cover.

Vulnerability.—The question of vulnerability would appear at first to depend entirely on visibility; or, in

other words, on the target presented to the enemy's fire, but this is only true to a certain extent. To obtain the minimum vulnerability it is of course necessary to have the gun as low and inconspicuous as possible, because the less it can be seen and the better cover it can obtain, the more difficult it will be to locate and hit. But the true vulnerability of the gun in comparison with infantry lies in the amount of front they occupy respectively; or in other words, the breadth of the target exposed to the enemy and the percentage of loss they can each sustain *without their fire effect being reduced*. Infantry will never again fight in two ranks in civilised warfare, and the closest formation possible for a firing line is one pace per man; 50 men will therefore occupy a front of, roughly, 50 yards; in other words, the target presented to the enemy is 50 yards in breadth, and, provided the elevation is correct, shots striking anywhere within this 50 yards will be effective. The machine gun, however, only occupies a front of from 4 ft. to 5 ft. 2 in., or $^{1}/_{25}$th *the front offered by infantry having equal fire effect*. It is on this point that the wonderful tactical possibilities of the machine gun rests: *the maximum of rifle fire from the minimum of front*. It is obvious that 10 per cent. of casualties in the infantry firing line reduce the fire effect by just that amount, while from 30 to 40 per cent. will probably silence its fire altogether or render it ineffective. The machine gun, on the other hand, is unaffected by even 50 per cent. of loss, while it can suffer 80 per cent. of loss without diminishing its fire effect, though such a loss would of course cause it to lose its mobility and seriously affect the morale of the gunners. A machine-gun detachment consists of from 16 to 24 men, but only two of them actually work the gun, and one man alone can fire the gun

once it is in action, the second man merely assisting him with the ammunition, etc., but he is not absolutely necessary to the firing of the gun. Thus we see that the killing of the gunner only causes a momentary cessation of fire until another man takes his place, when the fire is resumed without loss of intensity, accuracy, or concentration.

We are now in a position to form an accurate estimate of the potentialities of the machine gun and its true tactical value as compared with infantry, and we find:

1. Its fire effect	50 rifles at least.
2. Its mobility	Cavalry.
3. Its visibility	A file (2 men).
4. Its vulnerability	Unaffected by 50% of loss.

Before discussing their place in battle and tactical use it will be necessary to say a few words on the best methods of grouping the guns and organising their detachments and the training of the personnel in peace for the duties they will have to perform in war. In our service two machine guns are issued to each regiment of cavalry and battalion of infantry, and the detachment consists of:

	Cavalry.	Infantry.
Subaltern	1	1
Sergeant	1	1
Corporal	1	1
Privates	12	12
Drivers	8	2
Bâtmen	2	-
	—	—
	25 (1 officer)	17 (1 officer)

This section of two guns is therefore the smallest tactical unit, and the officer in command is solely responsible for the training and efficiency of his section. It is therefore absolutely essential that the machine-gun section commander should be a subaltern of not less than three years' service, specially selected for his keenness, efficiency, and self-reliance, who has passed the examination "C" for promotion, and who holds the special machine-gun certificate from a School of Musketry. A "destroyer" in the Royal Navy is commanded by a very junior officer, but he is most carefully selected for similar qualities to those mentioned, and is in addition required to possess the necessary professional qualifications—consequently it is a command much sought after, and competition enables the authorities to appoint the pick of the service and thus obtain the maximum efficiency where efficiency is the essence of successful employment in war. The best and nothing but the best is necessary to the successful employment of machine guns, and the importance of obtaining the very best officers as section commanders is so great that there is reason to doubt the utility of having machine guns at all if they are not commanded and handled by those who are in every way expert in their use.

In order to enable machine-gun sections to be trained in tactics and to co-operate with larger units in war, it is essential that they should be trained under a senior officer during peace. The late Colonel Henderson said of the Volunteers in Mexico: "The ideal of the battle is a combined effort directed by a well-trained leader: as individuals they fought well; as organised bodies capable of manœuvring under fire and of combined effort, they proved to be comparatively worthless." This is precisely the case

of regimental machine guns. It is easy enough to use a section or even a single gun apart from its battery should occasion require, but it is impossible to improvise a battery from a number of separate sections. It is therefore essential before attempting the tactical training of machine guns, much less their tactical use, to organise them in batteries during peace. For this purpose it is suggested that when a battalion is brigaded with others, either for administration or training, the six or eight guns should be formed into one or two batteries, under a selected field officer, who would be solely responsible for their peace training and tactical efficiency, and who would command them on manœuvres and on service. There would be little or no innovation in this, as our regimental signallers are at present trained and commanded on similar lines under the divisional signalling officer. A cavalry brigade under the present organisation (1909) would have one battery of six guns, and an infantry brigade two batteries of four guns each. The batteries of a Division would be commanded by the divisional machine-gun commander. While such organisation would in no way prevent the regimental machine-gun section being used with its own unit as at present, it would ensure a very high standard of tactical training, and enable the Divisional General to have a splendid reserve in his own hands for use at the critical moment of the fight as mobile as cavalry, in fire action more powerful than infantry, occupying the smallest possible front, yet capable of delivering a storm of some 10,000 bullets a minute with the maximum of accuracy and concentration.

The tactics in this book are based on the understanding that the machine guns are trained on this system, and that they are mounted on light,

adjustable tripods and carried on trained pack-horses with the entire detachment mounted.

The failure of machine guns is due to two principal causes: (1) Insufficient training in working the guns. (2) Improper tactical employment.

It will be obvious that unless the gun can be depended upon to open fire with certainty and accuracy, and maintain it continuously without jamming or mechanical failure, it is useless to consider its tactical employment. The mechanism of the Maxim is somewhat complicated and delicate, and depends for its proper working upon the exact adjustment of each part; but no more so than any other piece of modern machinery—it is far less complicated and certainly far less delicate than the modern motor-car. Indeed, the comparison is analogous in several respects, as both require highly trained operators to ensure their smooth and continuous working, and each individual machine, whether gun or motor, has its own peculiarities and requires special study to obtain the best results. Both are capable of hard and constant employment for long periods, without breakdown or failure, in the hands of an expert.

No one would think for one moment of engaging a chauffeur for a high-class motor-car who had less than six months' training and experience, and who was not capable of stripping and adjusting the motors and effecting minor repairs. It would be difficult to find a machine-gun detachment with a single man who possessed even these minimum qualifications. Apart from the mechanical knowledge it must be remembered that the man who fires the gun, known as No. I. in our service, has in his own hands the fire from 50 rifles, and on his own

judgment and skill as a shot will entirely depend the effectiveness or otherwise of this fire; it stands to reason therefore that he should be chosen primarily for his good shooting, but, in addition to his skill in aiming, he must be a good judge of distance and possess considerable intelligence, initiative, and self-reliance; for although he will usually receive orders as to target, range, rate of fire, and the moment for opening or ceasing fire, it will often happen that he has to use his own judgment in these very important matters.

As the gun is generally required to move and come into action independently of other troops, it must find its own scouts, who not only have to safeguard it from surprise when moving, but must be trained to select good positions whence it can come into action. For this reason the men of the detachment must be trained scouts.

To summarise:

(1) Only marksmen should be chosen.

(2) Trained scouts should be given the preference.

(3) The whole detachment must be trained as range-finders and scouts.

(4) The whole detachment must be proficient in judging distance.

(5) Only strong men should be selected.

The strength of a machine-gun detachment is given in Chapter IX. With the tripod mountings and pack transport the best *working* strength for a machine-gun section will be found to be the following:—

1 officer, 1 sergeant, 2 corporals, and 20 privates —that is, 1 N.C.O. and 10 men to each gun. It is

almost superfluous to say that the whole detachment must be trained to work and fire the gun, and should have a very thorough knowledge of its parts and mechanism, and be experts at remedying failures and effecting minor repairs. Until the whole detachment are so trained and can detect the cause of any failure instantly and remedy the same in the minimum time required, it is useless to attempt tactical training in the field. The preliminary training will take from three to six months, according to the ability of the instructor and the time available daily for work.

It will be found that certain men of the detachment are far more skilful in laying and firing the gun than others, and it is undoubtedly sound to specially train these men as gun-layers and to permanently allot to the two best layers the duties of Nos. 1 and 2 (*i.e.* the firer and his assistant). This should be the post of honour and coveted accordingly, and the two best gun-layers should be awarded a distinguishing badge. As no badge is authorised by our regulations, a lance stripe might be given to the best No. 1 of each gun.

In training the men of the section in the preliminary details of working the guns, the following points may be found of use. First frame a course of instruction for each day which will give systematic and progressive individual instruction in the following points: mechanism, name and use of every part, the working of the mechanism, care of gun, stripping and fitting, loading and firing; spare-part box, the name of each of its contents and recognition of every part *when out of the box*; failures, their recognition and remedy; gun-laying and firing, co-operation between layer, loader, and observer. This course should last at least three months,

provided not less than two hours a day are available. Drills may be combined with preliminary instruction at the end of the first month, and must aim at extreme quickness in dismounting the gun and opening *aimed* fire and remounting the gun again. The chief points in the preliminary training are that *all* the detachment are *equally* instructed. Training on the 20-yard range in barracks should take place during the third month, and special targets should be used to teach laying the gun, slow use of elevating gear and combined sights, traversing fire, fire control, rapid change of target, indirect fire. During this short-range practice the failures should be practically demonstrated, and firing on the range should never take place without making a few artificial failures to test the efficiency of the detachment. These failures should be introduced by the officer himself without the knowledge of the detachment, and should be so arranged as to occur naturally while firing. They should be timed by him in each case, and the record time for the remedy of each failure posted up in the barrack-room with the man's name. Artificial failures can easily be made by filing round the base of a cartridge so that it is torn off when fired; by loosening a bullet in a cartridge, by slightly flattening a cartridge so as to cause it to jam in the chamber, by wedging a cartridge in the belt, by introducing a blank cartridge, and by repacking the asbestos with dry packing. It will be found that by making two or three such jams every time the gun is taken out to fire the detachment will soon become expert in recognising and remedying failures.

The men should be taught that failures may be divided into two classes, viz. *avoidable* and *unavoidable*. The occurrence of an avoidable failure

should be looked upon as a disgrace to the firer. The *unavoidable* failures so seldom occur that they are negligible.

The *avoidable* failures are those due to (1) Fuzee spring adjustment. (2) Want of oil. (3) Dirt. (4) Want of water. (5) Bad packing. (6) Damaged ammunition. (7) Faults in feed due to badly filled, new, or damaged belts. Each machine gun will be found to work best with a certain weight of fuzee spring which can only be found by trial, and this weight will change from time to time as the gun wears. The machine gunner cannot be considered fit for further training until he has become so familiar with his gun that he can instantly tell by the sound if it is working at its best; just as a chauffeur knows at once if his engines are running perfectly, and can instantly detect the slightest defect and make the necessary adjustment of the spark, petrol, or oil to ensure smooth running. The unavoidable failures are so few and rare that they will seldom be met with, and can be quickly remedied, except the breaking of an important part. Failures due to defective ammunition are extremely rare provided ordinary precautions are taken to avoid placing damaged cartridges in the belt. A breakage in any part of the lock can be remedied in a few seconds by substituting the spare lock which should always be *on the gun* in action. The breaking of any other part of the gun will be an accident of rare occurrence and, provided the gun is properly inspected before use, may be more properly classified under accidents than failures. A modern machine gun in the hands of experts should never jam, while failure of automatic fire will be rare and momentary. Until this standard has been reached a machine-gun detachment cannot be considered fit to

begin tactical training. The Japanese in the late war were obliged to improvise the detachments for their hastily acquired machine guns; and Captain Matsuda, who commanded the machine guns with Prince Kanin's Cavalry Brigade, says: "Whereas at the battle of Peu-si-lau on October 12th we had some trouble after firing 1,800 rounds, on March 3rd the guns of one section after firing 11,000 rounds continued to work perfectly. *The gunners were absolutely familiar with their weapons.*" Lieut.-General Sir C. J. Burnett, K.C.B., remarked: "Like a good chauffeur, the Japanese machine gunner knows all the peculiarities of the weapon he fires and can tell almost by instinct when anything is going wrong." It is almost superfluous to say that the men of the machine-gun detachment must never be changed or taken for any other work. Nothing has been said of the necessity for training the detachment in the all-important duties of scouting, range-taking, and horsemastership during this period, but of course they are vital to ultimate success and must not be neglected.

Range practices will follow, and the peculiarities of the gun and its fire effect must be carefully taught during this period. The use of traversing and sweeping fire, combined sights, and observation of fire and the use of deliberate fire in imitation of rifle fire should be perfected during range practice, so that they may be carried out under service conditions during the field practices which follow.

The tactical training should commence as soon as the field practices have been completed. The course for this should be carefully mapped out beforehand and should be based upon the principles given in Chapter II. and in the chapter dealing with the arm to which the section belongs, and should culminate

in divisional manœuvres. This course might follow the following headings:

(1) Drill over rough country.

(2) Selecting a position.

(3) Selecting alternate positions.

(4) Taking up a position.

(5) Screening guns.

(6) Making artificial cover.

(7) Mutual support (movement and fire).

(8) Indirect fire.

(9) A battery working on a wide front in mutual support.

No drill for a battery has been authorised yet (1909), but the simple formations of a troop as laid down in *Cavalry Training* will be found admirably suited for a battery of machine guns on pack-horses with mounted detachment.

The writer is fully aware of the condition under which machine guns are officered and manned at present, and that a great error has been made in estimating the time required to train the detachments. The Germans, who have studied the question of machine guns with a thoroughness far greater than that of any other nation, have made them a separate arm of their service, under trained and permanent gunners, and they evidently consider that only specialists can attain the necessary efficiency.

However this may be, it is certain that the officer, whether commanding a section or the batteries of a Division, must be a specialist and a highly trained

one.

An officer commanding a company of Russian machine guns in the Russo-Japanese War, writing his experiences to the *Nouskin Invalid*, says:

"I have spent three years in studying machine guns, and consider myself proficient in their use, but I have always been convinced that the requisite skill and knowledge cannot be acquired in a shorter time."

The commanding officer who at present looks upon his machine guns in much the same light as he regards any other portion of his first-line transport—a necessary encumbrance taking away an officer and several men from their proper duties, and a source of anxiety when the regiment goes into action—would regard them with very different feelings if assured of their efficiency and relieved of the responsibility for their tactics and safety. That this is possible without altering the present organisation has been shown; that it is absolutely essential for their efficient use in war it is hoped to demonstrate in the chapters that follow.

CHAPTER II

GENERAL PRINCIPLES

"Each arm has its special characteristics and functions, and is dependent on the assistance of others; the full power of an army can be exerted only when all its parts act in close combination, and this is not possible unless the members of each arm understand the characteristics of the other arms."

The above paragraph from *Field Service Regulations*, Part I., 1909, aptly illustrates a principle which should be impressed upon every serious machine-gun student, for the principles of machine-gun tactics are based upon those of the arm with which they are co-operating.

The machine gun cannot yet be regarded as a separate "arm" in our service, nevertheless it possesses a power peculiar to itself; and until this power is studied and thoroughly understood, the principles that should govern its employment in the field cannot be grasped, and consequently its effective use is dependent on chance or accident, and for every success scored a dozen failures will occur, any one of which may be fatal. The preceding chapter has dealt with the peculiarities and power of the machine gun, and it will be seen that it possesses the fire effect of the infantry arm while it has several of the characteristics peculiar to artillery; for instance, it is fired from a mounting by one man, and is moved from position to position by draught or

pack animals.

We have seen that the chief characteristic of the machine gun is its power of delivering the "maximum fire from the minimum front"; this fire is of great volume and is highly concentrated, while it can also be made to sweep a wide lateral surface of ground. The gun's narrow frontage in action renders it easy to conceal, and when discovered it presents a very small and difficult target to the enemy's riflemen; on the other hand, when once discovered if it cannot be moved unseen to another position it is liable to suffer a prolonged and concentrated fire from the widely scattered riflemen of the enemy, to which it cannot effectively reply, and which must in time cause loss. Again, its range being limited, it is powerless against artillery except under special circumstances at effective rifle range.

The general principles governing its tactical employment depend upon three factors, viz. (1) the target, (2) the range, (3) the position.

The volume and concentration of its fire necessitate a large and vulnerable target, or ammunition will be expended without adequate results. The first essential is therefore to obtain this description of target and to avoid firing on others which may present themselves.

A large and deep target might justify fire being opened at long range, but such targets rarely present themselves on the modern battlefield, and its vulnerability will partly depend on the closeness of the range and partly on its formation. To obtain a suitable target of this description *surprise* is essential, and to effect a surprise it will be necessary to conceal the gun and its detachment in a well-chosen position.

Thus we see the three cardinal points for tactical success are—suitable *target* at close *range* from a concealed *position*.

FIRE EFFECT

Napoleon's maxim, that "fire is everything—the rest is of small account," is only applicable to the machine gun when the fire is *effective*. Nothing is so useless and wasteful as ineffective machine-gun fire, and the careful study of fire effect and how to obtain the best results is imperative with this weapon. The principles so ably stated in Colonel Mayne's excellent book, *The Infantry Weapon and its Use in War*, apply almost equally to machine guns, and should be carefully studied by machine gunners, particularly those chapters dealing with the employment of fire in the field.

We have already seen that the range of the machine gun is practically the same as that of the infantry rifle, but that the beaten zone is only half the depth and about half the width of the collective fire of infantry, partly owing to the rigidity of the mounting, and partly to the fact that the human error is greatly reduced by being concentrated in the person of a single individual, instead of being spread over some 50 men of varying temperament, nerves, and aiming powers.

In addition to these factors, the fire from machine guns is always "collective" and "concentrated" unless deliberately dispersed by the firer, while infantry fire is always "individual" and "dispersed" unless controlled by fire discipline under a leader. Fire discipline and fire control are in the hands of one man—there is no need to point out the target to a scattered firing line, and there is no delay in passing

orders down the line, or in the setting of 50 different sights for the correct elevation. Thus fire can be opened far more rapidly and accurately than with rifles, and can be at once directed on a fresh target without ceasing fire, while the effect can be seen by the firer, who can instantly change the rate or cease fire altogether.

The beaten zone is perhaps the most important factor in obtaining effective fire, and the following table, compiled from *Musketry Regulations*, 1909, gives the zone beaten by 75 per cent. at four ranges.

RANGES

	Zone containing 75 per cent. of shots (effective zone).			
	500 yards.	1,000 yards.	1,500 yards.	2,000 yards.
Depth	150 yds.	70 yds.	60 yds.	50 yds.
Lateral Dispersion	4 ft.	8 ft.	13 ft.	19 ft.

It will be seen that the 75 per cent., or effective zone, is deepest at 500 yards, and gradually decreases as the range increases up to 2,000 yards; beyond this distance it increases again in about the same ratio up to 3,000 yards.

The following formula will give the effective zone (75 per cent. of shots) approximately for all ranges up to 1,500 yards inclusive: $+ \frac{50{,}000}{\text{Range}}$.

Example for 1,000 yards: $+ \frac{50{,}000}{1{,}000} = 70$ yards,

which is the depth of the area swept by 75 per cent.

of shots, or the “effective” beaten zone. For ranges beyond 1,500 yards this formula is useless, and after 2,000 the beaten zone increases in depth, while the angle of descent of the bullets becomes so steep that the “dangerous space” is reduced to a minimum; and consequently the zone beaten by 75 per cent. of shots is no longer the “effective zone,” and it will be necessary to get the target within the zone beaten by the nucleus, or 50 per cent. of the shots. This zone at 2,500 yards range is about 50 yards in depth, so an error in estimating the range of more than 25 yards over or under the correct distance will render the fire “ineffective.” Even at 1,500 yards the “effective zone” (75 per cent.) is but 60 yards deep, which only allows an error of 30 yards over or under the correct range—a very small margin, even when using a range-finding instrument, but without an instrument it is obviously impossible to “estimate” or “judge” the distance with sufficient accuracy to ensure bringing the “effective zone” on the target.

For ranges over 500 yards it is absolutely necessary to know the range accurately or to find some other method of bringing the “effective zone” on to the target.

The machine gunner may be likened to the fireman with his hose-pipe, whose object is to bring the base of his jet of water to play on a certain spot some distance away from the nozzle of his pipe. He does not trouble about the distance, he does not require to know the range; but pointing the nozzle in the direction of the spot he desires to strike, he elevates or depresses it until he observes the base of the cone of water falling on the right spot, and then he holds his pipe so that it continues to fall where he desires; he does not trouble about the smaller streams and

drops of water that fall short or go beyond, but devotes his whole attention to keeping the nucleus of the stream—the 75 per cent. or 50 per cent. zone—falling on his "target." In precisely the same way the machine gunner must look upon his stream of bullets as a stream of water from a hose-pipe, and his object must be to cause the centre of that stream to play on the target, or, in other words, to bring the effective cone of fire on the target so that it is the centre of the beaten zone. This can be done by "observing" the strike of the nucleus of the shots and altering the elevation accordingly. On favourable ground fire can be observed by No. 1 up to 800 yards, but No. 2 with the aid of good glasses can observe fire on favourable ground up to 1,500. This observation of fire is the best method of obtaining the correct elevation at "effective" ranges (*i.e.* 1,400 to 600), if the ground is suitable. The procedure should be as follows: The range should be "estimated" by No. 1, who should then adjust his sight for 100 or 200 yards less elevation than the supposed distance, and fire "groups" of 8 or 10 shots; No. 2 observing the strike of the bullets and saying "short" or "over," as the case may be, while No. 1 alters the elevation between each group until No. 2 says "on," when fire may be continued, still observed by No. 2, until the desired effect has been attained. No. 1 must be careful to fire his first group of shots short of the target, as they are much easier to locate than shots which fall "over."

If the target is only visible for a short time, the groups may be "rapid," but as a rule "deliberate" fire at the quickest rate should be used, and "rapid" only used when the range has been found. If the ground is not favourable for the observation of fire, or the range is too great, this method cannot be used, and it

will be necessary to obtain the range by instruments; but it will not always be possible to do so, and it is necessary to find some other reliable way of ensuring that the target is within the "effective" zone.

Supposing the range to be estimated at 1,400 yards, the effective zone is about 60 yards in depth—therefore an error of only 30 yards in estimating the range can be permitted. There is but one way to overcome the difficulty, and that is by *increasing* the effective zone; and this can be done by using "combined sights," thus making two or more beaten zones which touch each other and overlap where the effective 75 per cent. of shots of both ends.

There are two ways of using combined sights:

(*a*) The "single gun" method.

(*b*) The "battery" method.

In (*a*), with an estimated range of 1,400 yards, the sights will be set for 1,300 and aim taken; then the sights will be again set for 1,500 yards, but without altering the original aim, and then "rapid" fire opened and the elevating wheel slowly turned to elevate the gun until the 1,500 yards sighting is aligned on the target. The result of this operation is to sweep the whole ground from 1,270 to 1,530 yards with effective fire; and if an error of 125 yards over or under the correct range has been made, the target is nevertheless brought within the effective zone by the combined elevations used. This is the best method for sections or single guns, and a section can vary this by one gun using 1,250 yards elevation and working up to 1,400, while the other gun begins at 1,350 and works up to 1,550. The choice of the amount over and under the estimated range must depend upon the ability of the person estimating the

range and circumstances of the case, but less than 100 yards over or under should never be used.

The second method (*b*) is only used where at least four guns are available, and requires six guns to obtain the best results. The range is estimated as before, and then each gun uses an elevation differing by 25 yards from the next: thus, taking 1,400 yards again as an example of the estimated distance, No. 1 gun will use 1,300; No. 2, 1,325; No. 3, 1,350, and so on, No. 6 using 1,425 yards.

In this way the effective zone of No. 1 gun, which is 60 yards in depth, will just overlap the effective zone of No. 2 gun, and so on right up to No. 6 gun. Thus instead of one small zone of 60 yards of effective fire, we have six guns joining to make one big effective zone 185 yards deep.

Care must be taken not to use more than 25 yards between sights at ranges over 1,400 yards, otherwise there will be gaps between each effective zone, and the fire would be ineffective should the target happen to be at a spot between any two zones.

The methods of firing the gun are laid down in the official Handbook, but it may be added that in using “deliberate” fire the double button should be pressed irregularly so as to imitate rifle fire, and with a little practice a rate of 120 shots a minute can easily be attained.

This kind of fire, although it should seldom be used, will occasionally be serviceable in ranging for observation when it is desired to do away with the peculiar sound of the machine gun and thus not disclose its presence prematurely. In covering a retirement it may also be found useful to deceive the enemy into believing they are only opposed by

riflemen, while reserving its full fire power until a good target presents itself at close range.

"*Continuous*" fire should be used in "gusts" or bursts of from 15 to 30 shots, a momentary pause being made to observe the effect, and, if necessary, to correct the aim. The great expenditure of ammunition caused by "continuous" fire renders its use only justified when the effect obtained is commensurate, and it should seldom be adopted until the circumstances justify it. But when a really good target is found at close range, the ammunition need no longer be considered until there is nothing left alive to fire at. Annihilation should always be the final aim of machine-gun fire.

TAKING UP A POSITION

Except under special circumstances, such as for covering fire or a demonstration, the battery will not move as such into position, but each section will be given its approximate place and move there independently, keeping touch, however, by signal or connecting files with the battery commander and acting in close co-operation with the other sections.

Positions are of two kinds, viz. (1) positions of observation, (2) positions of readiness.

The position of observation will usually precede the position of readiness, and the principal points are the concealment of the guns and detachments, the facilities for observing the enemy and for movement in any direction.

The position of readiness will be in the immediate vicinity of the fire positions, and the guns may be actually in position awaiting the target.

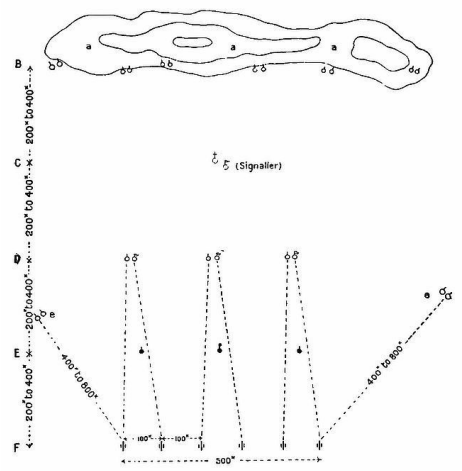
When moving alone on the march, scouts working

in pairs must be pushed well out ahead and on the exposed flank or flanks, and they should be trained to use a system of signals to indicate the following: (1) “All clear”; (2) “Enemy in sight”; (3) “A good target in sight”; (4) “Cavalry” (prepare for); (5) “Artillery within range”; (6) “A good gun position.”

Six simple and unmistakable signals can easily be arranged and learned during peace training, which might prove invaluable in war, for “opportunity” is everything to the machine gunner, and is usually so fleeting as to demand instant action in order to obtain success. On moving to occupy a position as a battery, the guns will usually be in line at from 10 to 100 yards interval, with the section commanders leading their sections and the scouts well ahead; the flank guns must arrange for the protection of the flanks by scouts in the same manner.

DIAGRAM III

TO SHOW FORMATION WHEN COMING INTO POSITION



aaa. The Position. B. Ground Scouts. C. Battery Commander. D. Connecting files. E. Section Commanders. ee. Flankers. F. Guns & Detachments.

The Germans consider that ground scouts should never go into the proposed position, as they are likely to expose themselves to the enemy, and thus "give the position away," and, as already pointed out, "surprise" is the essence of success. They say that the commander of the battery or section, whichever the unit may be, should alone examine the position and select the place for his battery or section to come into action—and this is the right method as a general principle; but in broken or hilly country, where cover is abundant, and where the position is extensive, a battery commander can do no more than indicate generally the positions to be occupied by the sections, and it will then be advisable for the section commanders to personally select the positions for their guns. If the cover is good, the range-finders may next occupy the gun positions and proceed to take ranges. They must be most careful not to show themselves in the least and should work from cover to cover, some distance from the gun positions and not on the same alignment. The ranges must be noted on proper range cards, and when complete sent to the section commanders. In open country, where there is no good cover in the position, the scouts will only approach it sufficiently to ensure that it is not occupied by the enemy, and will then halt and find a good position for the guns to be dismounted; the commander, passing through the scouts, will then reconnoitre the position himself, and select the place for coming into action. There are two methods of taking up a position, which depend for their choice upon the proximity of the enemy and

the time at which fire is to be opened. The first is the "deliberate" method, when the guns are brought up and the range taken before the target appears. In this case cover is essential to success, and the guns must be most carefully concealed, the whole object being to surprise the enemy when the moment arrives, and thus concealment is of the first importance. The second method is used when the enemy is in the immediate vicinity, when the country is open and the position without cover, or when the position is within artillery range of the enemy. The guns unlimber and prepare for action immediately in rear of the gun positions, and as close to them as possible and completely out of sight of the enemy. The commander alone goes into the position, and having selected approximately where each gun is to go, he stations them immediately in rear of their intended places out of sight and then creeps into the position himself and watches for the opportune moment; when this arrives, a blast on his whistle brings the guns up with a rush, no concealment is attempted, but, fully exposed, each gun opens fire on the nearest target. If the moment has been rightly judged and the range properly estimated, 60 to 90 seconds is sufficient time to obtain the desired effect, and before the enemy's artillery can get the range a second signal from the commander sends the guns out of action again as rapidly as they appeared. This is one of the most successful methods of employing machine guns: there is no risk of being seen before the target appears, there is no "giving away the position" by careless scouts, and there is no chance that a powerful pair of glasses will discover the guns in position before they open fire and turn the tables by surprising them instead. On the other hand, it requires very highly trained detachments and a vast

amount of peace practice to ensure its success in war.

Alternative positions are always necessary when the deliberate method is used, and must be carefully practised in peace—the principal points to be observed being: (1) That the second position is suitable for bringing effective fire to bear on the enemy, and (2) that the gun is able to gain the position without exposure.

Scouts so often forget that they can work with ease where it is impossible to carry a gun; and unless the above conditions are fulfilled, the alternative position will be useless.

The place for dismounting the guns must always be as close to the fire position as possible without exposing the teams to fire or view; the reserve ammunition must be brought up to this spot, and precautions must be taken to prevent the teams being surprised from the flanks or rear if exposed. Machine guns should never be advanced for a short distance. If it is desired to obtain a closer range, nothing is gained by moving two or three hundred yards, while the guns are exposed to considerable risk. The guns are just as effective at 1,000 yards as at 800, and when a closer range is necessary they must await the opportunity for moving up to close range, *i.e.*, 300 or 400 yards, where their fire may be decisive.

COVER

Cover may be of two kinds:

(1) *Cover from fire.*

(2) *Cover from view.*

Cover from fire must be proof against the

projectiles likely to be used against it—that is, against rifle fire and shrapnel. "Cover from fire" should also be "cover from view" if possible; it must be inconspicuous, and should be of the same colour and material as the background and locality. It must be as low as is compatible with command, and must never be on the skyline. The following points in the order given constitute good "cover from fire":

(1) Bullet proof.

(2) Good field of fire.

(3) Invisibility.

(4) Protection from enfilade fire.

(5) Good line of retreat (under cover).

"Cover from view" is often not cover from fire, and must be used with great caution; it is the principal means by which guns are brought up to the fire position without the enemy's knowledge, thus effecting a surprise. Cover may be either (1) natural, (2) artificial, (3) a combination of both.

"Cover from fire" will generally be artificial or a combination of natural and artificial cover, because natural cover will seldom be found that is suitable for machine guns, although *partial* cover from fire may often be found behind a bank, a rock, or in a ditch.

"*Cover from view*" will generally be natural cover, and will be used to conceal the guns while approaching a position to occupy it and, when in position, to effect a surprise. When used in position to effect a surprise, it must be remembered that the moment the guns open "rapid" fire the cover is no longer any protection—indeed, it may be a source of great danger should it be isolated or conspicuous,

such as a patch of scrub in a plain, or a clump of bushes on a hillside, as it will form a mark to aim at for every gun and rifle within range. “Cover from view” may be also “cover from fire,” as when folds in the ground or a ravine are used to conceal the guns. It may also be artificial cover, such as screens of boughs and brushwood as used by the Japanese at Liao-yang to conceal their march, or to hide guns in position. Hurdles covered with grass, reeds, bush, or branches of trees to closely imitate the surrounding growth, and placed as screens to hide the guns until the moment arrives for opening fire, will often prove a most valuable method of concealing guns in position, and under favourable circumstances the guns may even open fire from behind the screens without being discovered. This method requires constant practice in peace to attain success on service—indeed, the necessity for the most thorough peace training and constant practice in all the details of bringing guns into action, making cover, taking up alternative positions, retiring under mutual support, etc., cannot be too strongly urged on section commanders. Little ammunition is available for practice in our own service, it is true, but there is nothing to prevent constant practice in this vital duty of the machine gunner; and by getting a few men to represent the enemy, with an intelligent officer and a pair of good glasses, most valuable help can be given by criticising the manner the guns are handled, and the amount of exposure or concealment of the gun and detachment in taking up a position or making cover.

Artificial cover may be either excavated or built up, or a combination of both. Excavated cover will usually take the form of a pit of sufficient size to hold the tripod, ammunition, and three men, and

deep enough to conceal the gun and men not only from view, but from fire at “effective” range. This form of cover is particularly good on a level plain, the muzzle of the gun being just above the surface of the ground. The rear side of the pit may require to be enlarged to take the long leg of the tripod where time is limited and the pit has not been made large enough to take the tripod in any position, but it is advisable to make the pit of sufficient area to allow the gun to be worked in any direction. With an adjustable tripod, the pit should be so deep that the gun is completely concealed below the surface of the ground, and it is only raised when it is intended to open fire.

Other forms of cover consist of epaulements, trenches, sangars, etc., which will not differ essentially from those given in the manual of Military Engineering. In all types of “cover from fire” care must be taken that the cover is high enough to protect No. 1 from bullets fired at ranges up to 1,400 yards, taking into consideration the angle of descent of the bullets at that range and the distance of No. 1 from the cover.

Cover can seldom, if ever, combine all the points enumerated here, and it will lie with the section commander to discriminate between them and decide what points he will sacrifice in favour of others more important: thus it may be necessary, where concealment is the chief object, to forgo “cover from fire” at the longer ranges in favour of a low parapet or even none at all. It is only possible to indicate in outline the principles that should be followed; practice in training and the experience thus gained alone will make the reader an expert.

Shields will be found of great value in the final

stages of the battle, when machine guns are pushed up to close range to assist in the final assault. They are too heavy to carry on the guns, and should be with the ammunition in the first-line transport, where they are easily obtained if required.

COVERING FIRE

Machine guns will often be used to cover the advance of infantry from “long” to “effective” range when the artillery is still occupied in the artillery duel and the infantry first come under effective rifle fire from the enemy. The ease with which they can instantly open and cease fire, concentrate on a particular spot, or sweep a line of trenches, renders them particularly suited for this purpose, and the Japanese constantly used them to keep down the enemy’s rifle fire in this manner during the late war.

The narrow beaten zone enables them to fire safely over the heads of advancing infantry from all ranges beyond 800 yards, provided the infantry are at least 200 yards from the enemy fired at. A study of the table of trajectory in the Appendix to *Manual of Military Training* will enable the machine gunner to decide the circumstances under which the fire is safe in each case.

Positions on the flanks and if possible to the front of the advancing infantry will render covering fire most effective, but these positions will rarely be possible. The first consideration is the concealment of the gun from the enemy’s artillery, which can easily silence them if exposed. It is also necessary that the positions selected should be sufficiently commanding to enable the battery commander to see the attacking infantry during the whole advance, so as to fire only when they are moving, while at the

same time he must be able to see the position of the enemy's trenches and thus direct the fire on any part desired.

INDIRECT FIRE

The best method of using covering fire in the early stages of the attack is by *indirect fire* from the reverse slopes of a hill or from behind a ridge or other feature. This is not difficult to carry out and in no way lessens the accuracy of the fire or endangers the troops in front, as the following experiment will prove.

EXPERIMENT IN INDIRECT FIRE

The following is an extract from an article by First Lieutenant A. E. Phillips of the 10th Cavalry, from the *Journal* of the United States Cavalry Association for July 1909:

"To determine how many, if any, of the bullets from the machine gun would strike troops in front of an assumed 'hill' over which the gun was to fire, canvas frames were used to represent such objects, the targets being concealed from view.

"The target consisted of a strip of target cloth 6 ft. high and 15 yards wide, along the bottom edge of which is pasted a row of kneeling figures with an interval of a yard from centre to centre. Across the target and parallel to its top edge was drawn a narrow black line tangent to the tops of the heads of the figures. Value of hits on any figure = 5; value of hits on the cloth below the line = 3; value of hits on the cloth above the line = 1. Canvas frame, 8 ft. high, placed 200 yards in front of the gun. Rapid fire:

First Experiment

Range 800 yards

No. of shots.	No. of Hits.				Remarks.
	Figs.	5's.	3's.	Total.	
30	5	10	12	22	Line of sight was 5 ft. below top of obstruction. All shots over.
30	8	10	9	19	

Second Experiment

Range 1,000 yards

No. of shots.	No. of Hits.				Remarks.
	Figs.	5's.	3's.	Total per cent. of figs. hit.	
30	9	11	4	60	Line of sight was 3 ft. below top of obstruction. All shots over.
30	12	17	7	80	

Third Experiment

Range 1,200 yards

No. of shots.	No. of Hits.				Remarks.

	Figs.	5's.	3's.	Total per cent. of figs. hit.	
30	2	2	5	13	Line of sight was 3 ft. below top of obstruction. All shots over.
30	4	5	13	27	
30	8	11	9	53	

"It will be noticed no 1's were made. Assuming the height above the ground of the average mounted soldier as 8 ft., had a troop of cavalry mounted been 200 yards in front of the machine guns in the third experiment, the line of sight would have struck about the backs of their horses, and all bullets would have gone over the riders with at least 4 feet to spare, as proved by the experiment.... The troop mounted could have moved forward to within 100 yards of the target and would not have been struck by the bullets."

The methods of carrying out indirect covering fire will vary according to the nature of the position selected and the way the guns are to be laid. This is one of the few occasions when a battery or two may have all their guns in line close together. If the slope is a steep one, they may be pushed up close to the crest, but on a gentle slope they must be placed sufficiently far back to avoid the forward effect of shrapnel bursting on the crest line.

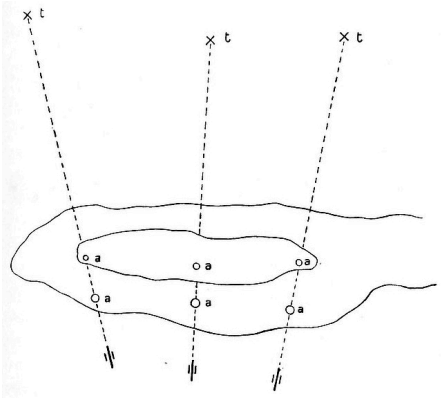
The battery commander will select the position for the guns and will then give each gun or section a section of front to fire on. The method of marking off this section is as follows: two iron rods about 3 ft. long for each gun are painted white, and are then

"laid off" from the gun to the target, in an exact line, the first being on the reverse slope a few yards short of the crest; the next on or just behind the crest line. By aligning the gun on the rods, fire is brought on the centre of the target; should traversing fire be required, the limits may be marked by similar sticks on either side.

There are two methods of laying the gun. (1) By observation of fire. (2) By quadrant elevation. The first method has been already described, and the second must be done by using the following table in conjunction with an instrument for elevating the gun at the required angle; but it must be remembered that each gun will require adjusting to its own angle of elevation to suit its known error at each range. Thus a gun which is known to require sighting at 900 yards when firing at 1,000 should receive 1° 10½ and not 1° 25½. When proper instruments are not obtainable, very fair results may be obtained by using an ordinary clinometer. The necessary allowance for the height the gun is above the target must be made, or, in other words, the angle of sight as shown by the clinometer must be deducted from the quadrant elevation given on the gun.

DIAGRAM IV

TO SHOW METHOD OF LAYING BY AIMING POSTS



aa. Aiming Posts (about 15[x] apart and some distance in front of gun.)

ttt. Targets.

TABLE OF ELEVATION FOR MAXIM ·303 USING AMMUNITION GIVING 2,000 F.S.

Range.	Angles of elevation on the Maxim gun.
200 yards	0 4·0 0 1
300 ”	0 9·5 ”
400 ”	0 17·0 ”
500 ”	0 25·5 ”
600 ”	0 35·5 ”
700 ”	0 45·5 ”
800 ”	0 57·5 ”
900 ”	1 10·5 ”
1,000 ”	1 25·5 ”
1,100 ”	1 41·5 ”
1,200 ”	1 57·5 ”
1,300 ”	2 16·5 ”
1,400 ”	2 37·5 ”
1,500 ”	2 59·5 ”

1,600	”	3	22·5	”
1,700	”	3	47·5	”
1,800	”	4	14·5	”
1,900	”	4	43·5	”
2,000	”	5	14·5	”
2,100	”	5	42·0	”
2,200	”	6	22·0	”
2,300	”	6	59·0	”
2,400	”	7	40·0	”
2,500	”	8	25·0	”
2,600	”	9	16·0	”
2,700	”	10	18·0	”
2,800	”	11	18·0	”

What is required is the angle of *quadrant elevation* to be put on the gun in order that the shots may strike the target at a known range. From range table obtain *angle of tangent elevation*; now if the target is *below* the guns we must *subtract* the angle of sight (*m*), if the target is *above* the guns we must *add* the angle of sight (*m*) to obtain correct angle of quadrant elevation.

To obtain angle of sight m

(1) When target is visible from the immediate vicinity of guns the angle may be measured by pocket clinometer or other mechanical means; or, if heights can be obtained from a contoured map, from the formula:

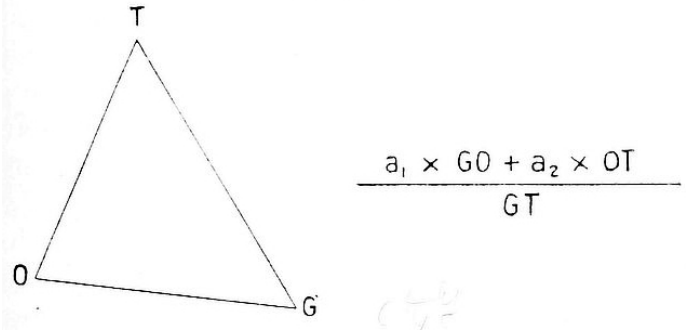
$$m = \frac{h \times 1146}{\mathrm{R}}$$

where h = difference in *feet* of height between guns and target; R = range in yards.

(2) When target is not visible from immediate

vicinity of guns, *m* may be found from the following formula:

DIAGRAM V



$$\frac{a_1 \times OG + a_2 \times OT}{GT}$$

Where a_1 is the angle of sight from O to G; a_2 is the angle of sight from O to T.

Angles of elevation are read plus, angles of depression minus; T being the target, G the gun, and O the observer.

Before firing it is necessary to ascertain that the trajectory will clear the intervening crest—*i.e.* see that the angle of slope to the top of crest is less than the angle of Q.E. at which the gun is likely to be fired. If there is an obstacle some distance in front of the guns, to ascertain if the trajectory will clear it make a liberal estimate of the range to the obstacle and ascertain if the quadrant elevation to be fired at is greater than that which would be required to hit the obstacle.

If it is possible to place a mark to aim at near the crest with a given elevation which will ensure the fire striking the target, this will much simplify

indirect fire, but the combination of circumstances required to enable this to be done will not often be found.

When all is ready to open fire the battery commander will take up a position from which to direct it, and will give the orders to open and cease fire and name the guns or sections to fire. The section commanders will watch the fire effect of their guns and give the orders necessary for correcting elevation or direction. The battery captain will assist the commanding officer by noting the fire effect.

It will be seen from the foregoing that considerable practice is required to enable indirect fire to be efficiently carried out; but the results obtained in covering the advance of infantry and thus enabling them to push up quickly to close range, without the delay and exhaustion caused by a prolonged fire fight, will more than repay the time spent in perfecting machine-gun detachments in this duty.

SUMMARY OF GENERAL PRINCIPLES

With Cavalry.—To enable it to retain its mobility and do away with the necessity of dismounting whole squadrons for fire action. To give it greater power both in attack and defence, and enable small detachments to hold important strategical or tactical points. To act as escort to artillery and to assist in the pursuit.

With Infantry.—To cover the first advance with fire. In attack they should be held back until the last reserve has been thrown in, when they must be used to bring an overwhelming fire to bear on the point selected for assault. Owing to their narrow beaten zone and great accuracy, they can safely fire over the heads of prone infantry within 100 yards of the

position. A Japanese officer who commanded a machine-gun battery at the battle of Mukden said on one occasion he “continued this fire until their attacking infantry were within 30 metres of the enemy’s position.”[6]

They may also be used to reinforce threatened points, when their mobility will enable them to arrive at a distant part of the battlefield with the rapidity of cavalry. They should rarely be used in the firing line, where their fire, being dispersed, is less effective than an equal volume of rifle fire, and where they are at once the target for every rifle. Machine guns can never engage artillery, and should avoid engaging other machine guns or firing on a line of skirmishers.

They are particularly useful at night with the outposts, and can be trained by day on roads, defiles, or bridges, and thus can be used in the dark to sweep the approaches with accurate fire.

The Golden Rule for Machine Gun Tactics may be thus expressed:

“Conceal your guns, utilise cover, and operate by surprise—for surprise is the essence of tactical success.”

CHAPTER III

EMPLOYMENT IN THE FIELD WITH THE INDEPENDENT CAVALRY

> The Germans have resolutely adopted the plan of attaching machine guns to cavalry, and they seem thus to understand the modern combination of fire and shock tactics. To the machine gun the fire action, to the horseman the morale action—so much the more easy and productive of results, as the machine gun is the more powerful.—CHIEF OF 2ND BUREAU, French General Staff.

Since this was written it has been generally recognised by the leading military authorities of the world that the machine gun is essentially a cavalry weapon; and Colonel Zaleski in a recent article on the lessons of the Russo-Japanese War goes so far as to say, "Even their addition to squadrons cannot be carried out too rapidly, and this weapon would now appear to be indispensable to cavalry."

The truth of this statement is obvious to the student of modern tactics who is also acquainted with the machine gun as organised and equipped on the Continent and in the United States, where it is as mobile as the cavalryman himself and as quick in coming into action.[7] When its true rôle is understood and its tremendous fire power made full use of, it will go far to render cavalry independent of the rifle, and to restore to them that dash and independence of action which made them the terror of the battlefields of the past.

The following extract from an article in *The Times*

newspaper of August 23rd, 1905, by their special correspondent with the Japanese Army in Manchuria, shows the necessity for machine guns by emphasising the danger of training cavalry to fight as infantry.

"The prime value of cavalry lies in its mobility. As an actual fighting unit in battle a body of cavalry is much inferior to an equal body of infantry. The discrepancy is less marked if the cavalryman carries a rifle, but there is always the encumbrance of the horses, which require the attention of one man in every four when the rifle is employed. It being postulated that tactics evolve themselves into the effort to obtain a superiority of rifle fire, it is evident that the necessity of dispensing with one quarter of a body of mounted riflemen before their weapons can be brought to bear greatly lessens the value of that body. On the other hand, the mobility of the mounted rifleman compensates for his comparative ineffectiveness to such a degree, it is believed in the British Army, that elaborate arrangements have been made for the provision and training of what is known as mounted infantry. Granted the value of mounted and mobile men as an auxiliary to infantry, the question arises, What is the weapon with which they shall be armed, and what the nature of the training to which they shall be subjected? These things depend upon whether the mobility of a mounted man is regarded as secondary to his function as a rifleman, or whether his weapon be merely adapted to his mobility. In other words, are mounted men wanted for their riding or their shooting? The arming of our cavalry with rifles, and certain modifications in its training, together with the formation of corps of mounted infantry, show that those who held the ear of the Secretary of State for War a few years ago

pinned their faith to the superior value of shooting, and regarded mobility in a mounted man only as a means to an end. If we turn to the conflict now proceeding in Manchuria, it is found that in one respect it differs considerably from other great wars, particularly those which have been fought on level ground. Cavalry has been conspicuous not by its absence, but by its utter and astonishing ineffectiveness. From Liao-yang northwards both armies have occupied part of the level plain traversed by the Liao River. The right of the Russian Army and the left of the Japanese have faced each other for nearly twelve months, in country as flat as a billiard-table and as suitable for cavalry evolutions as any of the low countries in which the famous leaders of last century made their reputations. Here have been conditions ideal for the employment of shock tactics; a veritable jousting-ground where the vaunted Russian cavalry might have run a-tilt at the sword-worshipping Japanese. Yet no single instance has been recorded of combat between mounted men, and to the best of my belief none has occurred.

"Is it, then, that those who advocate the substitution of mounted infantry for cavalry are in the right; that the lancer, hussar, and dragoon of picturesque memory have become obsolete in these days of the breechloading rifle? Almost it would seem so. But for two important considerations, the case for mounted infantry might well be deemed as proved. These considerations, however, are of such a nature as to lead the observer to directly opposite conclusions: to conclude actually that cavalry pure and simple is as useful to the army of to-day as it was to the army of Napoleon's day; and that it is totally erroneous to suppose that mounted infantry can be an efficient substitute for cavalry. The cause

of the effectiveness of Japanese cavalry is not far to seek. The men are the most intelligent of Japanese soldiers, and their many fine patrol performances are evidence of the sound methods in which they have been trained. Their weakness lies in the poor quality of the horses, and the fact that the Russian cavalry outnumbers them by six to one. Marked inferiority of force, in all forms of rivalry, is a fatal disadvantage, and it is for this reason that the Japanese have failed to shine in the rôle which experience has assigned to cavalry. The Russian cavalry, on the other hand, is estimated to number 30,000 sabres, a force of mounted men which, in the circumstances, ought to have made the lives of the Japanese commanders on the flank of the army a burden to them. Instead of which, life in the rear of the Japanese front has been a sinecure, a positive *dolce far niente*, undisturbed even by the distant flash of any of these sabres. Is this a proof that, if the sabres had been rifles, something could have been accomplished? Very far from it. It is because the Russian cavalry, armed as it is with rifle and—shade of Seydlitz!—bayonet, is trained to fight only on foot, thereby throwing away its most valuable weapon, mobility, that it has proved no more effective in the field than a flock of sheep. That the microscopic force of Japanese cavalry has held the Russian throughout the campaign—an exceedingly remarkable performance when it is remembered how indifferently the Japanese are mounted—testifies clearly enough that there must be something futile about the arming and training of the Russians.... They failed as cavalry and they failed as riflemen, and the reason of the failure was that they are neither fish, flesh, fowl, nor good red herring. They are organised as cavalry, but have been trained to dismount on service. In peace they

are armed with lance and sword, and in war they are asked to fight with rifle and bayonet. Truly an absurdity, worthy of one of those nebulous units evolved by our own Parliamentary reformers. Last month Mishchenko, marching forty-five miles in four long summer days, again descended on the Japanese flank, accounted for a couple of companies and a field hospital, frightened a number of Chinese carters, and stopped before a thin line of infantry guarding the approaches to Hsin-minting, where Japanese supplies are stored sky-high. Had he known it, he was within an ace of picking up a number of distinguished British officers, besides newspaper correspondents, and a famous general whom the Emperor William has specially delighted to honour. But an inferior number of riflemen checked the advance, and no use was made of the mobility of the column, except to retire by a circuitous route.... So far as my information goes, the Russian cavalry west of Mukden never once took the offensive during the battle. Strapped up with rifle and bayonet, they are incapable of wielding the sword; their lances, except in the case of a small proportion of the Cossacks, have been left in Russia. So it was useless to contemplate old-fashioned cavalry work. But the Japanese communications were an easy mark, and it is one of the most singular features of Russian tactics that they did not avail themselves of so glaring an opportunity. Even as mounted infantry they should have been able to destroy Nogi's communications. Yet they never made a single attempt at interference.

"The deduction is obvious: either the training or arming must be at fault. When a mounted man dismounts he sacrifices his mobility to become a weak infantryman. The Russian cavalry has been trained to fight dismounted, and the result is that the

Russians have divested themselves of the one arm which, many keen observers believe, might have availed to turn the tide in their favour. The battle of Mukden was a great defeat, though not an overwhelming disaster. At one period the result hung in the balance, and it is no wild statement to say that if the Russian cavalry had been trained and armed in orthodox cavalry fashion, and handled in a manner consistent with cavalry tradition, Mukden would have proved a drawn battle. It is my firm belief—a belief shared with many others more competent to judge—that if French, with 10,000 British cavalry, had been given a free hand early in the war on the Russian side, there would have been no necessity for Kuropatkin to retire from his strong position at Liao-yang, and I have no less hesitation in saying that if the same able commander, with such a cavalry force as I have mentioned, had been attached to the Japanese side at Liao-yang or at Mukden, there would be no Russian army in Manchuria to-day. *En passant* it may be remarked that if the Japanese cavalry had been capable of pursuit at Mukden, it would have proved a terrible thorn in the already bleeding Russian side. As it was, the Japanese were out-numbered and hence completely ineffective."

If the writer of this article is correct in his deduction of the lesson to be learned by cavalry from this war—and his opinion has since been confirmed by military opinion generally,—it would appear that the machine gun is just the one thing needed to give cavalry the fire power of infantry, while retaining mobility and their proper rôle in all the circumstances of the modern battlefield. It will therefore be instructive to study the possibilities of machine guns with cavalry in the various situations which may arise in the course of a campaign.

The use of machine guns in certain stages of an action is similar whatever the scale of the operations may be; and to avoid unnecessary repetition, such phases as the Pursuit, the Retreat, etc., have only been dealt with once. The tactics of the various bodies of cavalry are based on the principles laid down in the Training Manuals, the Independent cavalry being treated in this chapter, the Divisional and Protective in the next.

While the opposing armies are still at a considerable distance apart, the Independent Cavalry will gain touch with the enemy and endeavour to find out such information as may clear up the strategical situation and afford the main army strategical freedom of action; they may also carry out special missions such as cutting the enemy's communications, carrying out raids, or seizing important strategical points. This can usually only be accomplished when the enemy's cavalry has been defeated. It will therefore be the first duty of the Independent Cavalry to seek out and defeat the cavalry of the enemy in order to be free to carry out its mission.[8]

This Independent Cavalry will never be less than a Division, while it may consist of two or three Divisions in the case of a war between any of the Great Powers. The nation that is weak in cavalry will therefore do well to make up for this deficiency by the employment of great numbers of machine guns so organised and equipped that they will be able not only to accompany their cavalry anywhere, but, in addition, to operate and manœuvre as self-contained units. They will thus free the cavalry from the necessity of dismounted action when met by superior numbers, and from being compelled to detach

squadrons to secure tactical positions to check the enemy, or strategical points of importance which it may be vital to possess. In addition to this, detached machine guns may be used in the place of mounted escorts to the Horse Artillery, and to enable single troops to be used in the place of contact squadrons without detracting from their offensive or defensive strength.

The Divisional General of Cavalry will have 24 machine guns under the present organisation, viz. two guns with each regiment; and it must be assumed that they have been organised and trained to work together, as suggested in Chapter I., in order to enable them to be used as fire units in co-operation with their brigades or the Division. It will depend upon the nature of the country, the tactical situation and the strength and morale of the opposing cavalry, whether the G.O.C. retains all four batteries in his own hands or gives one or more to the brigade commanders. Every situation requires its own special treatment, and the following is only given as one of many possible methods of using machine guns in the preliminary stages of the cavalry combat. We will assume that a Cavalry Division is acting as Independent Cavalry and is operating against an unknown but superior force of cavalry as yet unlocated, in country such as will be met with in a European campaign.

The formation for the march towards the enemy will of course depend on the roads available and the general nature of the country, but an advanced guard of one brigade would be sent out with orders to push forward tactical reconnoitring patrols supported by contact troops or squadrons. This brigade might be given two batteries of machine guns, while the

G.O.C. retained two batteries with the main body, which would probably move as concentrated as possible in two wings with flank guards, and a battery of machine guns on each flank. The advanced guard commander would use one battery of machine guns to give each “contact squadron” a section of two guns and thus enable it to retain its mobility if held up by rifle fire. He would keep one battery intact to use in the manner to be indicated later with his main guard.

We will follow one of these “contact squadrons” and see how the machine guns may be employed to assist it. In the first place the squadron now possesses the fire power of an extra hundred rifles and can therefore afford to send out stronger patrols and give them more support. The contact squadron, having sent out its patrols and any detachments necessary for special services, will sooner or later be called upon to afford active support to one of its patrols when the latter come in touch with the enemy. Upon the information furnished by this patrol, as to the strength of the enemy and the nature of the country, will depend the action to be taken.

The necessity for brushing aside all opposition and pushing forward will probably cause the commander of the contact squadron to attack with vigour, and such a course will compel the enemy to accept the engagement mounted, or if inferior in strength or morale, to take up a position for dismounted action and hold the squadron by rifle fire.

In the first case the squadron with scouts in front will move in column of troops ready to wheel into line for the attack. The machine guns should move in line immediately in rear of the rear troop and as close as possible, so as not to be seen from the front.

The subsequent action of the machine guns must of course depend on the method of attack of the squadron and the nature of the country; but the objects in view will be (1) to support the attack by fire up to the moment of the collision, and then to bring fire to bear upon the retreating enemy and prevent their rallying; (2) to take up a position to cover the retirement of the squadron and enable it to re-form if worsted in the encounter. It is likely that if the first object is successfully attained and the fire of the section brought to bear on the enemy's squadron, from any range under 800 yards, for only 30 seconds, the effect on the closed body of horsemen, whether in column or line, would be such as to throw them into considerable confusion at the moment of the charge, while any attempt to charge the guns, even by a second squadron, must be abortive and result in disaster. The squadron leader should have arranged beforehand with his machine-gun commander to manœuvre with a view to this co-operation, and will give the signal a few moments before wheeling into line to attack, when the machine guns will gallop out to the most suitable flank, and come into action as rapidly as possible so as to enfilade the enemy's advance. The moment the charging squadrons mask the fire of the guns, they must remount and gallop to a fresh position in anticipation of the pursuit, in order to bring fire to bear on the retreating enemy and prevent a rally; or to cover the retirement of the squadron and enable it to rally and reform. The effect of his fire and the success or otherwise of the first collision will enable the section commander to decide instantly which of these two actions will be necessary. It will be seldom that the country is so flat that some feature cannot be found giving a good field of fire or commanding a

road, or bridge, or other defile by which the enemy must retreat, or which they must pass in pursuit, and the use of such features will greatly assist the action of machine guns. Although both guns will fire together before the collision, their subsequent action must be made in mutual support, one gun firing while the other races to a new position from which it can overtake and flank the retiring enemy, so that, if possible, one gun is always firing at effective range while the other is moving. In the same way, if covering the retreat of their own squadron, one gun will fire while the other retires to a second position and in turn covers the retirement of the first. The guns must not hesitate to separate widely in order to obtain unseen the best possible positions from which to fire, but must always be able to support each other. If the country is much broken, opportunities will be found for concealing the gun in a position from which to enfilade the pursuing cavalry at short range, or for bringing a cross fire to bear from both guns on a defile. Such an opportunity skilfully utilised, when the range has been accurately taken, and fire reserved until the main body is within close range (600 yards or less), should be so decisive in its result as to check the pursuit altogether and possibly turn defeat into victory, if the retiring squadron has had time to re-form and is in a position to launch a counter-attack at this moment.

To make full use of machine guns with a squadron, it is necessary for the squadron leader thoroughly to understand their power and capabilities, and to anticipate their action and the result likely to ensue; otherwise he will be unable to do more than passively accept their support, and will fail to reap the advantage of their principal characteristic—their ability to surprise and their power suddenly to

overwhelm with fire a superior body of troops.

Should the enemy's squadron be reinforced or be so superior in numbers that an attack appears inadvisable, it may be possible with the assistance of machine guns to equalise matters by concealing the guns in a donga or behind a ridge, a clump of trees, or group of rocks, and then manœuvring the squadron so as to draw the enemy across the front of the guns at close range. The best method of doing this is to lead the squadron, formed in column of troops, past the cover selected at a sharp pace, the guns being concealed on the outer flank or behind the rear troop as circumstances may require. As the squadron passes the selected spot, the machine guns will be dropped; and the squadron at the same moment wheeling into line towards the enemy, will hide the guns from view until they are concealed by the cover.

The gun horses and the rest of the detachment not actually required to fire the guns should move on with the squadron, so that no indication is given the enemy that the guns are not still with the squadron. If this manœuvre is successfully accomplished, it will not be difficult to draw the enemy across the guns at close range. It is a manœuvre well worth practice in peace, but an opposing squadron should always be used to try to detect the guns and thus ensure that the concealment is properly carried out.

We will now suppose a case where the enemy takes up a defensive position and the contact squadron has to force its way through. The squadron leader's method of attack must entirely depend on the strength of the position, the force holding it, and the natural features of the country in the immediate vicinity; and on his plan of attack must depend the

details of the action of the machine guns. The general principles governing their employment will remain the same, however much they may vary in the method of carrying out: the first is to supplement the rifle fire of the squadron so as to enable as many men as possible to remain mounted, while holding the enemy to his position; and the second is to gain superiority of fire for the squadron at the time and place selected by the squadron leader. We will suppose the position to be strong and the enemy to possess machine guns, and that the squadron leader's plan is to hold the enemy to his position by a vigorous frontal attack, while he turns the weaker flank. To do this he may decide to use his guns for the containing attack supported by a troop, or to use his squadron for the containing attack and his guns to turn the flank. Having machine guns in position against him, it might be advisable to choose the latter course, because machine guns are less effective against a skirmishing line of attackers, while his own machine guns are more effective if they can gain the flank or rear of the enemy's position and thus enfilade them, and any movement of mounted troops to repulse the turning movement, or take their attackers in flank, will afford the machine guns an opportunity for decisive fire action. Should the machine guns or one of them succeed in stalking the led horses of the enemy, their action will probably be decisive, as nothing affords a machine gun such an easy and effective target as the horses of a dismounted squadron, while the effect of fire on them is to render the squadron immobile and to place them out of action as cavalry altogether.

The method of attack will probably be as follows. Scouts (dismounted) having been sent forward to reconnoitre and draw fire to disclose the extent of

the position, two troops dismounted and widely extended will advance to the attack and open a heavy fire and push the attack as hotly as possible; at the same moment one troop (mounted) will move slowly round the flank which it is not intended to attack, keeping wide of the position and closed up, and in signalling communication with the squadron leader. This will probably draw attention to this flank, and the troop should report by signal any movement made by the enemy to check them. Rapid fire should now be ordered all along the line, and the troop on the flank should wheel and open out towards the enemy, but not approach within range if it can be avoided. Under cover of this demonstration, the machine guns with the remaining troop will work round the flank selected for attack, the guns being concealed on the outer flank of the troop and using every bit of cover possible to prevent being seen. Scouts must precede them, and the troop should screen their movements and engage the enemy with fire if opposed. Engagement with the enemy should be avoided as far as possible until the place selected for attack is reached, and the position turned. Even now the machine guns must avoid opening fire with the troop, and must endeavour to find a position from which an enfilading fire can be brought to bear at close range. Under cover of the surprise caused by the sudden burst of machine-gun fire, the second gun must push farther round to the rear, and try to fire on the led horses or catch the enemy's guns on the move, for they will certainly be moved to meet this fresh attack. If the horses cannot be reached, the second gun must seek the best position to bring a reverse fire in support of the first gun; and unless a really good target is obtained, fire should be reserved until the first gun is discovered

and attacked, when its intention to retire must be the signal for a burst of heavy fire which must be kept up until the first gun is in a fresh position and ready to open fire to cover the retirement of the second.

This action will enable the squadron leader to use the troop feinting on the other flank, which he will have recalled on the first sign of firing by the flank attack, in order to reinforce the point where the attack can be pressed home.

The machine guns must avoid engaging those of the enemy, while always endeavouring to catch them limbered up, *i.e.* when changing position or while coming into or going out of action, for then they are most vulnerable. The situation at the moment of the flank attack is this: The front of the position is attacked by a strong but widely extended firing line which overlaps the flanks and compels a strong defensive firing line to check its advance. If the defender decides to put his machine guns into position here and to reserve half the squadron for defence of the flanks, the great extension of the attack renders their fire of little effect as long as the attack utilises cover and advances by rushes from the right or left of sections; on the other hand, if he decides to put the squadron into the firing line and to use his machine guns to protect his flanks, he has either to divide his guns or wait till he can see which flank is threatened, and he cannot ignore the troop which is moving against one. Consequently, he must either be weaker than the flank attack—in which case it is likely to succeed; or he must withdraw troops from his position to strengthen the threatened flank—in which case there should be no difficulty in pushing home the front attack with the aid of the extra troop; while the position of the machine guns

on the flank and rear should render his retirement from the position very costly. In all probability the threat of turning a flank either by mounted troops or by machine guns will compel the enemy to abandon the position in the case of a minor engagement between squadrons—especially where a counter-attack is rendered impossible by the strength of the frontal attack.

When touch has been gained by the contact squadrons and the enemy found in force, they will either be compelled by superior numbers to fall back or they must be at once supported; in either case the advanced guard will now become engaged and will endeavour to break through the advanced guard of the enemy, or, if in touch with the main body of the enemy's cavalry, will endeavour to prevent him breaking through till their own Cavalry Division comes up.

If it is decided to attack, the action will follow much the same lines as that of the contact squadrons, but on a larger scale and with the addition of artillery; and the machine guns will be used in much the same way to support the mounted attack up to the moment of the charge, for which purpose the machine guns working in pairs on the opposite flank to the artillery must be pushed forward to occupy positions from which to bring fire to bear on the hostile squadrons while manœuvring prior to the attack. The whole battery may be used for this purpose if the ground favours their action; or a single section only, while the remainder are held back as a reserve to complete a successful charge or to cover the retirement of the brigade in the event of failure.

The officer commanding the machine-gun battery will remain with the brigadier and must be perfectly

acquainted with his plans, and will receive from him direct orders as to the way the guns are to be employed to support the attack. The details for carrying out these orders should be left to the battery commander, who will issue his own instructions to the section commanders, who should also be told the brigadier's plans. The section commanders must be given a free hand in selecting fire positions and in all details relating to coming into action and opening and ceasing fire—the battery commander's orders only indicating the flank and extent of the positions of observation for each section, the method of action and the object to be attained. Under special circumstances he may order certain specific action such as reservation of fire, simultaneous fire on a given signal, or concentration of fire of a certain target; but it must be remembered that definite orders of this nature tie the hands of section commanders, and tend to paralyse their action and destroy initiative, and can be justified on rare occasions only. Should the enemy take up a defensive position, the machine guns will be used to economise dismounted men and to bring a sudden and intense fire to bear on the defenders when they attempt to retire from the position. Cavalry will not "assault" a position, but rather try to compel the defender to retire from it by turning a flank and threatening his led horses or his line of retreat, while he is held to his ground by fire. Some guns should also be held in reserve to meet a counter-attack or to be launched in pursuit when the enemy attempts to retire. The machine guns with the contact squadrons will be available, as these squadrons become merged in the main guard, and they must now be used to hold tactical positions of importance and to hinder the march of the main body of the enemy by seizing

all rising ground in front or to a flank of the approaching cavalry.

The Division will now have concentrated and joined the advanced guard, and will be manœuvring in anticipation of the cavalry combat. All the machine guns, except those holding positions in front, will now be concentrated under the Divisional General. They will be used at this stage in conjunction with the artillery—but not in their vicinity—to support the deployment of the Division by their fire, and they must necessarily be concentrated and employed as batteries in order not to hinder the deployment and free manœuvre of their own cavalry. The flank opposite to that of the artillery must be used, and "positions of observation" must be maintained where the guns are concealed from view and if possible from artillery fire.

The officer commanding the machine guns of the Division should remain with the G.O.C., and must be perfectly acquainted with his plans and intentions. As a rule fire will not be opened in the first instance except by his order. Officers commanding batteries must be where they can best direct their fire and at the same time be in signalling communication with their Chief. Ranges will be taken from the "position of observation," but should the guns have to gallop to a fresh position and fire at once, the opportunity for using combined sights by the battery if the range be unknown and the time limited should not be neglected. Rising ground is very important at this stage, for it enables fire to be maintained until just before the collision.

Should the ground permit of the machine-gun batteries approaching the enemy unseen, and enable them to reserve their fire from a concealed position

until the closed bodies of the enemy's squadrons come within effective range, the result should be so decisive as to render the attack of the Division successful, even against greatly superior numbers. The machine guns should render the envelopment of a flank by a superior force impossible, and their great mobility will enable them to meet easily any movement of this kind.

They should avoid the enemy's artillery, which alone can put them out of action, but they must boldly engage it within effective ranges should it open fire on the cavalry.

The defeat of the independent cavalry alone will be of little value, and it will be necessary to ensure their complete destruction to enable the exact situation of the enemy's forces to be discovered. A close and relentless pursuit is therefore imperative, and it must be remembered that machine guns with cavalry are far more effective in the pursuit than cavalry alone, because they move with the same speed; but whereas cavalry can only use the sword or lance against others similarly armed and capable of defending themselves, and both men and horses are equally subject to exhaustion, the machine guns on overtaking the enemy are able to shoot down men and horses without any more effort than is needed to set up the guns and work the elevating and traversing gear. The exhaustion of men and horses has no effect upon the accuracy or intensity of the fire, while the result is further to scatter and disperse bodies that may still retain any cohesion.

IN THE PURSUIT

There are many instances in war when cavalry flushed with victory and exhausted in the pursuit

have been themselves caught and ridden down by troops that have rallied or by fresh supports; but machine guns have nothing to fear from cavalry, and can confidently await their attack while covering the retirement of their own cavalry. The longer they are in action, the more time there is for their own horses to recover their "wind," and be ready to carry their guns out of action at a speed which renders pursuit useless. It must be remembered also that the machine guns with cavalry cannot be distinguished from that arm at a distance even when moving alone, while it is impossible to do so when they are with their regiment or brigade.

The machine guns must anticipate the pursuit and race off to positions on the flanks and rear from which they can best cut off, and if possible annihilate, the retreating squadrons; no effort must be spared to inflict the maximum loss, and guns must be pushed up to close range even at the risk of being ridden down.

The troops reserved for the pursuit should have their machine guns with them, as their co-operation will be of the greatest service, and regiments will probably act separately, and may be directed to special points to intercept the enemy or prevent reinforcements coming up.

The Independent Cavalry, having defeated and scattered the enemy's cavalry, are now in a position to send out strategical patrols; and having "torn aside the veil" are able to see the dispositions of his main armies, and are free to undertake raids on his communications and to harass and delay the march of his columns.

Raids are only justified when some specific object can be attained, and are only likely to be effective

during the course of operations, when both armies are in touch and awaiting reinforcements to renew hostilities.

The cavalry will in most cases be more profitably employed in attacking the enemy's main columns in flank or rear, and thus hindering their march by causing premature deployment. This action will bring the independent cavalry in contact with infantry. The machine guns can now be used to supplement the fire action and to enable as many squadrons as possible to remain mounted. They should be employed as separate units or attached to squadrons according to the nature of the engagement and the force to which they are opposed. Usually they will be held back in the preliminary stages of the dismounted fight, until the action has developed sufficiently to enable the general situation to be seen, when they will be sent forward under cover to positions from which they can develop superiority of fire, by concentrating against the enemy's strongest points. This will not prevent the use of a few guns with the advanced guard to seize and hold important points, and nothing should prevent machine guns from seizing the key of the position, the moment this can be discovered.

The four batteries of machine guns of the Division may be allotted as follows: With the advanced guard, one battery; with the main body (for use in firing line), two batteries; with the G.O.C. (in reserve), one battery.

TO COVER RETIREMENT

This reserve battery will enable the G.O.C. not only to reinforce a particular point or cover the retirement with a rapidity and effectiveness that no

other form of reserve could do, but to use it to turn a flank or to meet a counter-attack without exposing his squadrons to fire during the movement. The security they are able to afford to the horses of the squadrons in the firing line will justify their occupying "positions of observation" on the rear flanks, from which they can protect them while waiting other employment. The deployment of the enemy's infantry and the development of his fire will compel the cavalry commanders to break off the engagement; and to do this without loss under the heavy rifle fire to which he will now be subjected, this fire must be temporarily checked or rendered ineffective. Every machine gun will therefore be brought up to such positions as will enable them to sweep the enemy's firing lines, and under a simultaneous fire from the 24 guns the dismounted men will be able to retire from the firing line and regain their horses. The retirement of the machine guns must be effected in the usual way, each section acting independently and retiring by alternate guns —no gun moving till the other is ready in a fresh position to open fire. The sections on the flanks should retire first, as they are better able to protect the centre by a cross fire.

COVER IN FIRING LINE

When the country is flat or the features devoid of natural cover, it will be necessary to provide pits for the machine guns practically in the firing line. If this is carried out with skill, the guns may be perfectly concealed, and protected even from artillery fire. These pits should be made along the whole front and as widely scattered as possible, and when a gun is discovered by the artillery it should immediately be lowered into the pit, out of sight, where it will be

perfectly safe, until the artillery directs its fire elsewhere. The following instance from the Russo-Japanese War is an illustration of the skilful handling of machine guns under such conditions.

EXAMPLE FROM RUSSO-JAPANESE WAR

On June 8th, 1905, at Wan-ching, General Samsonov had two cavalry regiments and a machine-gun section of four guns. During the dismounted action these machine guns were concealed in the firing line, two in the centre 100 yards apart, and one on each flank about 400 yards away. When the firing line retired, the machine guns opened fire and held the position alone; and so well had they been posted, that although attacked by infantry, which advanced to within 300 yards of the position, supported by artillery which brought a heavy fire to bear on the front occupied by the machine guns, they were able to hold their ground for nearly three hours, when the Japanese abandoned the attack and fell back. It would be interesting to know if this astonishing success of machine guns, enabling the cavalry to defeat infantry supported by artillery in a fight of several hours' duration, without risking their personnel or abandoning their mobility, was due to the use of natural cover or, as seems more probable, to the use of pits which would have afforded protection from artillery fire as well as concealment.

IN THE BATTLE

The hostile columns having arrived within striking distance, the battle will now take place, during which the Independent Cavalry will usually occupy a position in front and on the flank of the main line of battle. From here they will be able to co-operate by

attacking on the flank, from which they can bring fire to bear concentrically with the main attack, while such a position favours pursuit on parallel lines, and is also a suitable one from which to prevent pursuit in the event of a retreat.[9] The machine guns will now assemble in batteries under their G.O.C., who will use them, as the occasion may demand, to hold "positions of observation," to protect his front and flank in the early stages of the battle, and later, in conjunction with a few dismounted squadrons, to envelop the enemy's flank and bring a powerful volume of fire to assist the main infantry attack, or to draw troops away from the point selected for assault.

"The climax of the infantry attack is the assault which is made possible by superiority of fire,"[10] and the cavalry commander will be justified in using his 24 machine guns in assisting to attain this object, provided that in doing so they remain under his immediate orders and in a position from which they are instantly available for the pursuit.

We have already seen how machine guns should co-operate in the pursuit, and their mobility will render them even more effective when pursuing infantry. The following example from the Russo-Japanese War may be of interest in this connection.

EXAMPLE OF MACHINE GUNS USED IN PURSUIT

A Russian infantry battalion which was retreating by a pontoon bridge across the Taitzu River was almost annihilated by a Japanese cavalry regiment, accompanied by machine guns, which swept the bridge; "and for the first time in this war," adds the *Standard* correspondent with Kuroki's army, "a machine gun was used with decisive effect."

CHAPTER IV

EMPLOYMENT IN THE FIELD WITH THE PROTECTIVE CAVALRY

Each army will usually be divided into several columns, each preceded by its advanced guard, the whole covered by the Protective Cavalry. The bulk of the latter will be scattered or remain concentrated according to the size of the zone in which it is to operate, the nature of the ground, and the first dispositions of the enemy. The veil thus formed will only be torn aside when the artillery and infantry of the advanced guards open fire.[11]

It is probable that the side which is weak in cavalry will dispense with Independent Cavalry altogether, and will meet the Independent Cavalry of the enemy with their Protective Cavalry supported by machine guns. The Japanese, who were outnumbered by six to one, were unable to use Independent Cavalry, and during the early stages of the war supported their cavalry by infantry. The Russians, who possessed masses of cavalry, used them principally as Protective Cavalry, if we except the raids made by the Division under Lieutenant-General Mishchenko after the fall of Port Arthur. The Protective Cavalry will therefore, in such a case, not only have to prevent the enemy's Independent Cavalry from obtaining information by penetrating their screen, but will also have the task of obtaining information as to the enemy's numbers and direction of march. That they are able to do this even in the

face of greatly superior numbers has been proved by the Japanese, whose cavalry, outnumbered and badly horsed as they were, succeeded throughout the war in a remarkable degree in penetrating the enemy's screen and obtaining information. The Russians, on the other hand, in spite of their masses of cavalry, failed not only to destroy the diminutive force opposed to them, but even to penetrate their thin veil or obtain any information of what was taking place behind it.

Are we not in precisely the same position as the Japanese in our numerical weakness in cavalry, and should we not be confronted by the same problem in the event of war with a military nation?

Let us, then, see how the Japanese Protective Cavalry was able to fulfil its mission in spite of the vastly superior numbers of its opponents. In the first place the Japanese cavalry is trained in the orthodox cavalry spirit, which is highly developed; suppleness and power to manœuvre for the delivery of the attack is the chief aim, while the charge is regarded as the culmination of manœuvre. Swordsmanship, horsemanship, and independent scouting are the features of individual training, while only thirty rounds per annum are fired in the musketry course, from the carbine with which they are armed in addition to the sword. The consequence is that the whole cavalry is saturated with a spirit of enterprise and daring, and a firm belief in its superiority to all other arms in manœuvre and offence. It was this spirit and confidence that enabled them, when outnumbered and deprived of their swordsmanship, to retain their dash and mobility, while using their carbines from behind village walls against the hosts they were unable to ride down. It must be

remembered that the Japanese had practically no machine guns at the beginning of the war, and those hastily purchased after hostilities broke out were required at Port Arthur. Consequently, the Japanese had to solve the problem of how to oppose the masses of Russian cavalry with their few but highly trained squadrons, and their solution was to hold up the Russian cavalry by fire on every possible occasion, and to be held up by them as seldom as possible. For this purpose they were closely supported by infantry; and it is of interest to remember how our own light infantry were used in much the same way in the Peninsula—the 13th Light Infantry being actually mounted for the purpose. Can we ignore the lesson? Is it not plain that machine guns would not only have done the work of the carbine and rifle far more effectively, but instead of depriving the cavalry of much of their mobility and preventing them from being made full use of—as undoubtedly was the case—they would have enabled them to go anywhere with the certainty of being able to defend themselves against a greatly superior force of cavalry.

The action of Protective Cavalry on a large scale is so similar to that of Independent Cavalry—especially in the matter of patrols and contact squadrons—that it will be unnecessary to reconsider these duties. In speaking of the duties of the Protective Cavalry, *Field Service Regulations*, 1909, Part I., Chapter V., observes: “These functions of the Protective Cavalry will entail principally defensive action, and will necessitate extension over a considerable front; but the commander must dispose his force in sufficient depth to enable it, with the assistance of the advanced guards of the columns in rear, to check any attempt to break through and surprise the main

body."

It is obvious that fire action is here indicated, and a preceding paragraph states that mounted infantry will usually accompany the Protective Cavalry, though it is to be doubted if it will be found possible to provide horses for this purpose in time of war.

Machine guns, however, will provide the necessary fire power without requiring many men or horses, and the use of a few extra batteries of machine guns with the Protective Cavalry would give them all the stiffening and defensive power of infantry without detracting from their mobility as cavalry. If the Japanese have taught us anything, it is this—that our cavalry, small as it is, if properly supported by strong and well-trained batteries of mobile machine guns, will be able to more than hold its own against greatly superior numbers in a European campaign. To attain such an end we should at once organise cavalry machine-gun batteries, and attach two batteries to each brigade in addition to the guns they already possess. This would give each cavalry brigade the fire power of a battalion of infantry (900 rifles), while in no way detracting from their mobility, as they would only occupy the road space of two extra squadrons, and move just as rapidly over any country. The alternative is to follow Colonel Zaleski's advice and attach two machine guns to each squadron, which would give the same number of guns, but would be likely to detract from the efficiency of both guns and squadrons. We are, however, dealing with existing organisation, and, however much we may desire to increase the efficiency of our Protective Cavalry, we have only one battery of six guns with each brigade instead of the visionary three. Let us see how we may use them

to the best advantage.

Supposing the Protective Cavalry to consist of one brigade, they will probably be extended to form a screen over a considerable front. The exact formation and method of advance will entirely depend upon the proximity of the enemy, his strength, and the nature of the country. We will suppose the country open and both flanks exposed and the enemy in the immediate vicinity, the contact squadrons or patrols having gained touch with him. The duties of the Protective Cavalry are the tactical reconnaissance, and the occupation of positions of tactical importance to the infantry and artillery.

With so small a number of machine guns as a single battery, it will be necessary to decide where they may be most usefully employed, and a great deal must depend on the particular situation. If the tactical reconnaissance is incomplete, they may be used in the first instance to hold the enemy in front while the squadrons move round the flanks to complete the information required. If used in this manner, they must be handled with dash, and, working in widely extended pairs—two in the centre and two on each flank—must push forward and try to surprise the enemy in close formation, moving from position to position and never remaining stationary after fire has been opened, provided cover exists to hide movement. Six guns co-operating in a vigorous offensive, unopposed by artillery, can push up to close range and do immense damage, while the enemy should be quite unable to decide what numbers are opposed to him. A ridge, a gully, a road with good hedges parallel to the front, is sufficient to conceal the movement of machine guns; and as they have nothing to fear from cavalry and can always

retire if galled by rifle fire, they can dominate the situation if handled according to the principles already laid down for them.

Where the tactical reconnaissance has already been completed and the principal object is to protect the force covered, machine guns will be found most valuable to support the flanks should an attempt be made to turn them, as their mobility enables them to be sent to a distant point with great rapidity, and their concentrated fire at once makes itself felt at a threatened point and turns the scale in a fire fight with astonishing suddenness. This mobility renders them particularly suitable for seizing and holding positions until the main body comes up.

When used for this duty the battery or section commander, as the case may be, should receive definite orders as to the importance of the position he is sent to hold and how long he is expected to remain there. The position should be carefully reconnoitred by scouts before the guns approach it, and steps should be taken at once to entrench the guns and teams against artillery fire if the position is to be held for any time. Alternative positions for each gun, with concealed approaches, should be constructed, and the guns carefully hidden by erecting screens in front of them, or by placing them behind bushes, which are then cut almost through the stem, so that they can be instantly removed to open fire. Ranges must be taken and carefully written down, with their compass bearings to conspicuous marks. The flanks must be protected, and dead ground made good by posting one gun to sweep it. The gun horses and detachment not on duty should be posted well to the flank and rear where they can obtain the best shelter from view and

fire. Signalling communication should be established with the rear and flanks when possible.

Very definite instructions must be given as to when and on what targets fire is to be opened, and the temptation to fire at patrols or small bodies of the enemy must be resisted. Fire should only be opened in the first instance by the order of the senior officer present, and in all cases should be reserved as long as possible.

The battery of machine guns may also be used during the cavalry combat as already described in the last chapter, and when used as a reserve on a flank, should take up “positions of observation” if the ground permits, from which they can repulse a flank attack, while remaining ready to move off at a moment’s notice to any point where they may be required.

Machine-gun commanders with the Protective Cavalry must bear in mind that their object must always be to help their cavalry in attaining the end in view, be it reconnaissance, attack, or resistance, and that close co-operation with the cavalry commander is essential. The most brilliant action causing loss or defeat to a portion of the enemy is useless if it does not directly further the object of the Protective Cavalry; and if we are unable to give here many examples from recent campaigns, it is principally due to this want of co-operation and consequent inability to make effective use of the machine guns.

The report made by Captain Golochtchanov, who commanded a detachment of six machine guns attached to the 11th Orenburg Cossacks during the last few months of the war, contains a vivid

description of the reconnaissance of the Japanese position made on August 14th, 1905, at Sitasi, by the regiment forming the advanced guard of Major-General Grêkow. “At about 4 a.m. the Russian cavalry attacked the Japanese outposts, consisting of three companies of infantry and two squadrons. While waiting for the situation to be cleared up, the machine guns were kept in reserve. Two and then four were sent against the enemy’s flank; the Japanese retired from position to position. At one o’clock the fight stopped; the Russians had carried three villages and determined the line and direction of the enemy’s trenches. Their task was accomplished. On the Russian side there were only 100 rifles in the firing line, with four machine guns.”[12]

“Instead of marching at a uniform rate and distance in front of the main army it may be advantageous at times for portions of the Protective Cavalry to move rapidly forward to some natural feature, such as a ridge or river, along which it will establish posts of observation, the intervening country being watched by patrols, the line being divided into sections with suitable supports for each. The remainder of the force will continue to maintain a line of observation in rear, until the new line of observation is taken up; it will then concentrate and move up to support the latter, or pass through it to form a more advanced line.”[13]

When this method of advance is used the machine guns working as independent sections should be used to hold important features, such as bridge-heads, defiles, passes, and villages in the line of observation. If positions are carefully selected whence effective fire can be brought to bear on points which the

enemy must pass in close order, and the usual procedure as to cover, concealment, and range-taking is observed, the mounted troops may be spared much fatigue and given opportunities for resting men and horses.

USE OF MACHINE GUNS IN A RETREAT

During the battle the Protective Cavalry will be used in the way already described in the previous chapter, in which we also dealt with the Pursuit; we will therefore now see how they may be used to assist a Retreat.

"When retreat appears inevitable the routes to the rallying position should never be so close to the battlefield as to come at once under the fire of the enemy. It should be occupied as soon as possible by some portion of the artillery, and by complete infantry units. *The cavalry and other mounted troops, aided by a strong force of artillery, will meanwhile check the enemy's advance*, and the remainder of the force, with the exception, if possible, of a rear guard in support of the mounted troops, will move as rapidly as possible to the shelter of the rallying position and there reorganise. Steps should be taken immediately to secure any bridges, defiles, or other vital points on the line of retreat, at which the enemy's mounted troops might intercept the force. Commanders of retreating troops must recognise that their greatest danger will arise from attacks in flank delivered by the enemy's mounted troops and horse artillery; if possible, therefore, they should take precautions that *all ground commanding their line of retreat is occupied by flank guards*."[14] The action of the Protective Cavalry is indicated in the first paragraph quoted in italics, while the second gives the only method by

which a retreat can be rendered successful or secure. In no phase of modern war are machine guns so valuable as during a retreat, and it is quite probable that, properly organised and handled, they may make the pursuit so difficult and costly as to render the retreat a far less dangerous undertaking than it has been in the past. It is not difficult to realise that an arm possessing such great mobility, together with rapidity and concentration of fire, before which no closed bodies can exist at effective range, will be able not merely to check and delay pursuing cavalry, but may even prevent any effective pursuit by mounted men alone.

The lack of machine guns on the side of the Russians in the late war renders this point still to be proved by a future campaign; but it is well known that the machine guns with the 1st Siberian Army Corps constantly checked the Japanese pursuit, and more than once rendered a flanking movement abortive.

The moment that it is evident that a retreat is necessary it will be the duty of the Protective Cavalry commander immediately to collect all his cavalry, with a view to checking the enemy's advance, and at the same time he should apply to the G.O.C. for as many machine guns as he can spare, and this is certainly the occasion when all the mounted machine-gun batteries should be sent to the commander of the rear guard.

The first step will be to allot one or more batteries to the troops forming the two flank guards and to the main guard covering the centre. The general situation at this moment will of course govern their use. "The commander will determine, in accordance with the features of the ground, whether delay is

best brought about by the occupation of positions blocking or flanking the enemy's line of advance and the employment of fire action, or by a vigorous and timely attack by a body of horsemen. Frequently, however, opportunities may be offered for acting wide on the flanks, where even the threat of a mounted attack or a sudden dash from ambush may cause the enemy's pursuit to be delayed without the force becoming too deeply committed."[15] In either case the important thing for machine guns to do at this stage is quickly to seize ground from which to bring effective fire to bear across a wide extent of front. Dealing first with the commander of the batteries allotted to the centre, he will consult the O.C. cavalry and arrange with him his plan of action. It is of the first importance to stop the forward movement of the enemy on the direct line of retreat, as this is the easiest line of pursuit and the one upon which the most shaken portion of the troops will be found. The probable course of action for the machine guns here will be to break up into sections and form a line along the nearest feature of ground immediately in rear, from which fire can be brought to sweep the front and check direct pursuit. The more broken the country and the more commanding the ridge or other features, the more effectual will be the check, for at this stage guns will certainly be prominent in the pursuit and shelter from their fire will be very necessary.

The fact that the machine guns are working in pairs on a very wide front should make it exceedingly difficult for artillery to locate them, except singly, and thus it will take them a considerable time to silence more than one or two of the scattered line of guns. Alternative positions and the constant change to a fresh one after opening fire

will render the majority of the machine guns capable of remaining in action until closely engaged by the infantry. This will cause considerable delay, and by the time a serious infantry attack develops the machine guns will be able to retire to a fresh position. In anticipation of this, the battery commanders will have sent scouts to the rear directly the guns are in position, and they should personally examine the new line to be taken up, and select the gun positions for each section. One scout should remain in the new position of each section and the other return to the gun horses of his section, to guide them when the moment for retiring takes place.

The gun horses should be as near the guns in action as possible; but should the position be such that this is impossible without exposing the horses to fire, then all the spare rifles of the gun-team must be used to open rapid fire to conceal the fact that the gun is being moved. The guns of each section must arrange with each other to cover their own retirement, but the battery commander must issue the order in the first instance and will arrange which sections move first.

Where the pressure is great and co-operation difficult, it may be advisable to retire by half sections along the whole front at the same moment; thus the right guns of sections may be ordered to retire on a given signal, while the left guns cover them by a heavy continuous fire. If this method of retirement is adopted, it will be necessary for the second position to be within long range of the first, which is not always advisable in covering a retreat. It will seldom be possible to select a concealed position in the early stages of the retreat, but it must be borne in mind that if a concealed position can be occupied, and fire

reserved until the pursuing cavalry are at close range, the effect of such a surprise will do much to check the pursuit, and impose such caution on the enemy that they will hesitate to press on without those precautions which necessitate deployments and thus cause much delay.

The machine guns allotted to the flanks should form the supports to the cavalry there; and if two batteries are available on each flank, one should accompany the cavalry to enable it to remain mounted, while they provide the fire action necessary to support it in the attack and to cover its retirement in the face of superior numbers. The detail of such action has already been given with the Independent Cavalry. The other batteries will break up into sections and move parallel to the line of retreat in single file at wide intervals, keeping touch with the cavalry by scouts on the outer flank. The object of this battery is to seize and hold good positions on the flank of the line of retreat until the main body has passed. The scouts of the rear section of this battery should get into touch with the scouts of the flank gun of the centre battery from time to time, to ensure proper co-operation between the various batteries.

The importance of concealed positions from which to ambush the pursuers must not blind machine-gun commanders to the necessity for seizing and holding to the last possible moment, even at the risk of capture, every position from which the retreat can be effectually covered and the pursuit delayed. Should a river or other natural obstacle be encountered on the line of retreat, machine guns must freely sacrifice themselves in covering the retirement of the cavalry across the bridge or beyond the obstacle.

Cavalry is the most costly of all arms, and cannot be replaced during a campaign; machine guns are the least expensive in proportion to their fire value, and the easiest to renew; they must consequently save the cavalry when they can, even if they sacrifice themselves in doing so.

ESCORT TO ARTILLERY

There is one important duty which machine guns are able to perform better than any other arm, and that is escorting artillery, but more especially horse artillery. When cavalry are detailed for this purpose they not only deprive squadrons of much-needed men, but can only provide three rifles in action to every four men of the escort, owing to the necessity of providing horse-holders. In addition to this drawback, the horses provide a costly fire-trap for the shells of the enemy's guns which may go wide of the battery. For these reasons, where it is possible to spare them, a section of machine guns should be allotted to each battery of artillery when an escort is necessary.

They should march in the rear of the battery when on a road, and on the outer flank when in open country and away from cavalry. The sole object of the machine guns is to afford protection to the battery from cavalry, and to prevent rifle fire from being brought to bear on them from effective range; therefore the section commander must devote his whole attention to this object, and he is not justified in opening fire on any target that does not directly threaten the battery—this especially applies to that stage of the mounted combat immediately before the collision, when the guns are firing on the opposing squadrons.

The section commander will be under the immediate orders of the battery commander, and should be acquainted with his plans and intentions. He should remain with him until the position for action has been selected, when he will immediately seek the best position from which to cover the guns, taking particular care not to mask or limit their radius of fire nor hinder their line of advance or retreat. This will necessitate a careful but rapid survey of the ground in the vicinity of the position, in which good ground scouts, who have been previously trained in this work, will materially assist. The most suitable positions will usually be found well to the front and on the inner flank of the battery from 200 to 600 yards' distance. It may be occasionally possible to place a machine gun on each flank from which a cross fire can be brought to bear on ground in front of the guns; but such a position on either side of the battery, unless the ground is particularly favourable, has the disadvantage of rendering fire control difficult, and may hamper the fire or movement of the battery. The principal considerations which should govern the choice of a position are as follows:

(1) Good field of fire to protect the battery from attack.

(2) Position clear of the fire and movement of the battery.

(3) Immunity from artillery firing on the battery.

(4) Concealment.

(5) Cover from fire.

There should be no dead ground in front or on the flanks of the battery, and with two machine guns this condition can generally be satisfied. In cases where

one flank remains exposed and cannot be protected by the fire of the machine guns, or where a portion of the front or one flank cannot be seen, scouts must be placed well out in this direction, where they can see anything approaching and signal timely warning of it, and a position must be selected beforehand to which to move a machine gun should the warning be given. It has already been pointed out in a previous chapter, and may be repeated here, that machine guns have nothing to fear from cavalry under any circumstances, and when in a selected position with ranges accurately known, as they would be in this case, a single gun properly handled could easily stop a squadron. When selecting the place for the led horses, it must be remembered that fire from the enemy's guns is likely to search the reverse slopes of the position immediately in rear of the battery.

The machine guns must not be re-horsed until after the battery has limbered up and moved off, as they are then most vulnerable. They should endeavour to come into action before the battery unlimbers—though this will seldom be possible with horse artillery.

CHAPTER V

EMPLOYMENT IN THE FIELD WITH INFANTRY

The employment of machine guns with infantry seems at first sight to be obvious, for they fire the same ammunition and have the same range and kinetic effect. Nevertheless the first machine gun was used by the French in 1870 as artillery, and its name "mitrailleuse" indicates "grape shot" rather than rifle bullets. This initial error in its tactical employment, together with its crude mechanism, artillery carriage, and short range (about 500 yards), enabled the artillery to silence it early in the battle, so that it rarely proved of any use.

On the few occasions when it was concealed from the artillery and used at short range against the infantry, its effect was as astonishing as it was decisive. At Gravelotte several batteries of mitrailleuses concealed near St. Hubert's Farm reserved their fire until the attacking infantry was on the glacis within close range. The result was decisive, and the German attack was repulsed with terrific loss. Again at Mars la Tour, the German official account describes the repulse of the 38th Prussian Brigade by mitrailleuse batteries placed on the crest of the hill, as causing them such losses as to amount almost to annihilation. The brigade lost more than half its numbers and two-thirds of its officers.

When it is remembered that this mitrailleuse was not automatic, but had to be operated by hand, that

it had 25 barrels and a maximum effective range of only 500 yards, and that it cheerfully engaged in the artillery duel at ranges between 2,000 and 4,000 yards, the only wonder is that, having accomplished so much, the reasons for its failure were not immediately apparent, and that it has taken nearly forty years to convince the world that tactics are as necessary for the effective employment of machine guns as for infantry. The general principles for their tactical employment have already been dealt with in Chapter II., but they are so excellently condensed in Sect. 187 of the German Regulations, that at the risk of repetition they may be quoted here.

"Machine guns enable commanders to develop at fixed points the maximum volume of infantry fire on the smallest possible front. Machine guns can be employed over any country that is practical for infantry, and when they are unlimbered they must be able to surmount considerable obstacles. In action they offer no greater target than riflemen fighting under like conditions, and they can, in proportion to their fire value, support far greater losses than infantry. They can utilise all cover that infantry are able to use. Cover which is barely sufficient for a section of infantry (60 men) can protect an entire machine-gun detachment (six guns)."

In order to see in more detail how machine guns should be employed with infantry and the limitations of their tactics, it will be necessary to follow the sequence of the infantry combat in attack and defence, and to assume such situations as seem likely to arise.

ADVANCED GUARDS

The action of the infantry of an advanced guard

will follow the same lines whatever the dimensions of the force, and the battalion is a convenient unit with which to deal. There are four battalions in a brigade, and three brigades in a Division; consequently the Divisional General will have six batteries of four guns each, or 24 machine guns, under his command. We will assume that the battalion we are dealing with forms the advanced guard of its brigade, and that the Brigadier has given it a battery of four machine guns, two of which will probably belong to the battalion.

Field Service Regulations, 1909, page 79, says: "An advanced guard is divided into a vanguard and a main guard.... The special duty of the vanguard is reconnaissance. It will therefore generally be composed of the advanced guard mounted troops, with or without a body of infantry as a support. By day, when the country is open and the advanced guard is strong in mounted troops, infantry will not as a rule form part of the vanguard.... The main guard comprises the troops of the advanced guard not allotted to the vanguard."

We will first take the case of infantry with the vanguard as a support to the mounted troops, and suppose that two companies are allotted for this duty and have been given a section of machine guns. The formation of the infantry of the vanguard will largely depend on the nature of the country and the proximity of the enemy. Where the country is open plain they will probably be extended in a long line of skirmishers, in which case the machine guns should march close in rear of the centre on the road. Should the country be close or broken, the vanguard infantry may be confined to the road—with small parties pushed out to the front and flanks—in which

case the machine guns should march in rear of the advanced party, and not in rear of the vanguard. It must be remembered that machine guns are able to come into action and open a heavy and accurate fire in less time than it would take infantry of equal fire power to deploy and to open fire from a position; it is therefore the machine guns of the vanguard that should be the first to open fire and give the infantry time to deploy and find fire positions. When the enemy is encountered the object of the vanguard infantry must be to support the cavalry as quickly as possible, and enable them to mount and push forward round the flanks.

The section commander must go forward at once with scouts from each gun, and quickly grasp the situation, consulting the officer commanding the troops engaged as to the action to be taken; he must then select the positions for his guns to come into action. The scouts should take ranges and have everything ready for the guns to open fire on arrival. The moment the guns open fire, the section commander should send scouts off to find alternative positions to the front and flank from which it may appear possible to enfilade the enemy. Should the target be unsuitable, *e.g.* a line of well-concealed skirmishers, etc., fire must be *reserved*, and the guns should take up positions of observation while the section commander and scouts seek for a position on the flanks from which to bring an effective fire.

As soon as the vanguard infantry are deployed the section commander must co-operate with them entirely, and must take his instructions from the vanguard commander, who should leave him a free hand, merely telling him his intentions and how the guns may best assist him.

When the main guard comes up, in the case where the vanguard is checked, the section commander should take the earliest opportunity of placing himself under the battery commander, and at this stage the guns should be used to seize and hold positions of importance, especially artillery positions. If the advanced-guard action discloses the fact that the main body of the enemy has been encountered, and the G.O.C decides to engage, the advanced guard will be required to seize all positions of tactical value and to hold off the enemy until the main body has had time to arrive and deploy. Their action will vary according to whether the G.O.C. decides to act on the offensive or defensive. The latest German Regulations say: "On becoming engaged, that side will have the advantage which gains the start over its opponents in readiness for action, and thus reaps the benefit of the initiative." No arm is better able to assist in this than the machine gun, and every available battery should be brought up at this stage to take part in the advanced-guard engagement.

The Germans say: "The advanced guard will fight on a wider front than that ordinarily allotted to a force of its size, so as to seriously engage the enemy. It will be disposed in groups more or less detached, which will occupy those positions the possession of which will most protect the deployment of the main body. *It will be assisted by detachments of machine guns, which will be placed for preference on those positions which it is most necessary to prevent the enemy from capturing."*[16]

The commander of the machine guns of the advanced guard is under the immediate orders of the O.C. advanced guard, and must co-operate with him throughout the engagement. All officers with

machine guns must remember that isolated action is useless, and that however effective their fire may be locally, unless it directly furthers the object of the action, it is an unjustifiable waste of fire power.

The seizure of ground likely to be of use to the main body—particularly artillery positions—must be the first consideration of machine guns with the advanced-guard infantry, once the infantry are in action. That they can hold these unsupported is certain. “There never has been and cannot be such a thing as a successful attack on a line of machine guns in a favourable position in action, until the machine guns have been well battered by artillery fire,” says Lieutenant Parker in his book *Tactical Organisation and Uses of Machine Guns in the Field*.

In the cases where the infantry of the advanced guard forms the main guard, the battery of machine guns should march with the foremost body of troops and should never march in rear, where they are useless, and where, if on a road, they can only be moved up with difficulty. The battery commander should remain with the O.C. advanced guard until he is fully acquainted with the situation and his intentions. Should the situation be such as to enable the advanced guard to brush aside the opposition, the machine guns must be used vigorously to support the infantry attack, and should be pushed forward to seize positions before the infantry deploy, and cover their deployment by fire. In the preliminary stages these positions will probably be on the immediate front, and the four guns should be able to occupy a front roughly coinciding with the first deployment of the infantry. As soon as the infantry come into action the machine guns may be withdrawn and used on the flanks to bring a cross fire to bear, and to fire on

any closed bodies, led horses, etc., that may offer a target. At this stage the guns should work in pairs in mutual support, and may be used on one or both flanks as the situation requires.

Machine guns should rarely be used in the firing line after the infantry deploy, as they offer a rather marked target and can be far more profitably employed in pressing the attack on the flanks.

There are several instances of the successful use of machine guns with the advanced guard in South Africa in 1900 to support the mounted vanguard, and on many occasions they were able to brush the enemy aside without deploying the main guard or delaying the march of the column.

THE ATTACK

Under cover of the advanced-guard action and the subsequent artillery duel the infantry will deploy for the attack. The first advance of the infantry will probably be covered and supported by the artillery, and they will generally be able to push forward to within long range of the enemy's infantry, without the necessity of covering their advance by rifle fire. From here, however, the firing line will begin to suffer from rifle fire, and it will be necessary to reply to this fire in order to cover the further advance.

"To enable the attack to be prosecuted it is clear that from this moment the hostile fire must be met by fire of greater power, *its intensity and duration being dependent on the effect produced*. Moreover, from this point forward movement will as a rule be contingent on the mutual fire support afforded to one another by neighbouring bodies, and on the effects produced by the *covering fire brought to bear on the*

enemy's line wherever the ground admits of such action, by supports, reserves, and the troops specially told off for this purpose. Covering fire should be delivered so as to strike the enemy, disturb his aim, and compel him to seek shelter when the assailant is exposed or in difficulties. *In such circumstances intensity of fire is of the first importance; but fire should be reserved when the assailants' progress is satisfactory, or when he is under cover.*"[17]

No one who has controlled the covering fire of infantry, even on manœuvres, will dispute the immense difficulty of timing the opening and ceasing of such a fire, with even a company, to coincide with the advance of the troops covered; while the necessity for observation of fire and its concentration on certain parts of the enemy's position make it still more difficult effectively to cover the advance of troops with rifle fire at long range.

That machine guns will be able to perform this duty far more effectively and easily than infantry is manifest from the nature of the fire required, the features being *intensity*, *control*, and *concentration*, all of which are characteristic of machine guns. When required to cover the advance of infantry, machine guns should be used in batteries and must be so placed that they are able to see the infantry they are covering, and to sweep those portions of the enemy's position from which fire can be brought to bear on the advancing troops. If the enemy's artillery is not silenced or at least dominated by that of the attackers, it will be necessary to conceal the machine guns from view and provide cover from fire. That machine guns well concealed and provided with cover (pits) are able to remain in action under artillery fire for considerable periods, is proved by

instances in the Russo-Japanese War (see Chapter III. p. 28). Major Kuhn, who was with the Japanese Army in Manchuria, in his report states: “Importance is laid on concealing the guns, and it was claimed that none had been knocked out by the Russian artillery.” Covering fire from the flanks is more likely to be effective than frontal fire, because it will enfilade entrenchments, reach men behind natural cover and have a more disconcerting morale effect than frontal fire. It will not always be possible to find suitable fire positions on the flanks for machine guns at this stage of the attack, and it will then be necessary to place them in rear of the attacking infantry and fire over their heads. This can be done with perfect safety—indeed, there is far less danger of accidentally hitting the attacking infantry with machine guns than with artillery fire. Direct fire should only be used when it is impossible to use indirect fire on account of the nature of the ground in the vicinity.

Indirect fire from the reverse slope of a hill has the advantage of concealing the guns and rendering them immune from artillery fire. The position must be carefully selected with due regard to the slope in its relation to fire from the enemy as laid down in chap. ii. p. 67, of *Training Manuals Appendix*, 1905. The best position is just below the crest of a steep slope, as observation of fire is rendered easier and the effect of shrapnel minimised. The safety of the infantry in front will depend entirely on the range, height of the guns above the infantry, and the position of the target (enemy). On level ground the range must not be less than 800 yards,[18] and the infantry will be perfectly safe at all distances between 200 yards from the guns and 200 yards from the enemy. (See table, Appendix A.) The

methods of employing indirect fire have been given at the end of Chapter II., and its success will depend largely upon the careful observation of fire by the section commanders, who must concentrate their attention on this alone—the battery commander giving the signal for opening and ceasing fire, and the target or direction of fire for each section. Machine guns used as covering fire have ample time for preparation; and as ranges can be accurately taken, and great deliberation used in selecting positions, observing fire, and correcting errors, the maximum of accuracy should be attained. If the enemy is entrenched against frontal fire, good results may be expected from accurate distant fire, owing to the angle of descent of the bullet causing the low parapet or shallow trench to be no protection.

They were successfully used by the Japanese as covering fire for infantry in the attack, as the following examples will show: "At Mukden on March 1st all the machine guns of a whole Japanese division (12 to 18 guns) were brought into action upon a Russian *point d'appui*. The Russian fire was silenced, but burst out again whenever the machine-gun fire slackened. The Japanese infantry used these pauses in the enemy's fire to press forward to close range *under cover of their machine-gun fire*."[19] On March 2nd the three machine guns of the 10th Japanese Infantry Regiment acted in the same way against a Russian fieldwork. This method of employing machine guns requires the closest co-operation with the infantry from the commencement of the attack.

Again, during the Japanese attack on Namako Yama the infantry were greatly assisted by covering fire from their machine guns directed on the Russian

trenches. These guns were used from behind *screens*, and their success was largely due to their being well concealed.

It will rarely be advisable for machine guns to follow infantry into the firing line, where they present a conspicuous target which attracts fire and renders their withdrawal difficult.

We made this mistake in the South African War more than once. At Rietfontein the machine-gun detachment of the Gloucester Regiment, which had followed the battalion into the firing line, was almost annihilated. At Modder River the Scots Guards Maxim gun accompanied the firing line, and the detachment was annihilated by pom-pom fire, and the gun was left on the field alone all day.[20] In the attack on Cronje's laager at Paardeberg, machine guns were used in the firing line on the left bank of the river, and when the attack failed the machine guns, having suffered severe losses, could not be withdrawn and had to be abandoned till nightfall.

When the covering fire of machine guns is no longer considered necessary, they should be withdrawn and concentrated in batteries in rear of the reserve or in such other convenient position as the G.O.C. may direct. They should take this opportunity of refilling belts, replenishing ammunition, water, etc., and if the guns have fired many thousand rounds, of exchanging barrels.[21] They are now at the immediate disposal of the G.O.C. and will be used by him as a mobile reserve. Circumstances vary so in war that it is impossible to particularize in their use at this stage, but their great mobility will render them extremely valuable in the following cases:

1. To assist a turning movement.
2. To reinforce a distant flank.
3. To repel a counter-attack.
4. To hold a captured position.

When the infantry reach close range, the point for the assault will have been selected and the reserves massed behind this point. When the reserves have been thrown in, and the fire fight has reached its height, the moment will have arrived when one side or the other will obtain superiority of fire. "*The climax of the infantry attack is the assault which is made possible by superiority of fire.*"[22] To assist in the attainment of this superiority of fire is the true rôle of machine guns with infantry, and, as their beaten zone at short ranges is so small, they can safely fire over the heads of prone infantry, even when the latter are within a hundred yards of the target. The guns should now be pushed up to the closest ranges, and fire of the most rapid description concentrated on the point of assault. When it is remembered that the machine guns of a single Infantry Division, as at present organised, can bring a fire of more than ten thousand shots a minute from close range where its accuracy is assured, at this crisis, there will be no need to say any more on the tactical importance of the probable result.

In bringing machine guns into action for this purpose, they will generally be used in batteries, but may come into action in sections or even single guns once the objective has been pointed out. The object being to obtain superiority of fire regardless of cost, rapidity and concentration of fire must be the principal points. The guns must therefore press forward to the closest range, and where it is possible

to bring a cross or enfilading fire to bear, the opportunity must not be neglected. It may be necessary to fire over the heads of the infantry or even to push guns into the firing line itself, though this is seldom desirable if good positions can be found in rear. When any portion of the line advances to the assault, fire must be concentrated over their heads on the position assaulted; and when they are so close to the position as to render such fire impossible, fire must not cease, but be directed over the position so as to strike the enemy as they retreat. Fire from machine guns may be kept up from 500 yards' range over the heads of prone infantry within 100 yards of the target with perfect safety, and from 800 yards over infantry advancing to within the same distance. General Nogi, speaking of the use of machine guns in the attack, says: "Our troops trained machine guns on the most advanced lines of infantry *to overwhelm with fire the points at which resistance was greatest.* Sacks of earth were used to mask them. *They have often enabled the infantry to advance with success.*" M. Ullrich, war correspondent of the *Gazette de Cologne*, was present in many engagements in which machine guns were pushed up to support the firing line in the final stage. He says: "In the offensive the Japanese frequently made successful use of machine guns. *When the infantry were carrying out a decisive attack, they were supported by their machine guns, which concentrated their fire on points arranged beforehand....* When machine guns have been skilfully employed, their action has been infinitely more effective than that of field artillery, more especially when they fire at infantry ranges." The following is an example of their actual use in this way. "The Japanese," says a Russian eye-witness of the fighting round Mukden, "brought up during

the night dozens of machine guns with hundreds of thousands of cartridges to their front line of skirmishers, from 400 to 500 yards from our positions, and entrenched them there. *When the assault commenced, at dawn, the machine guns opened fire with fatal accuracy on the parapets of our trenches and on our reserves*, preventing them from coming up. We could do nothing with the enemy, because when the machine guns showed the least vulnerability, they were at once protected by shields of bullet-proof steel."[23]

The machine guns of the enemy will all be in action during the final stages, but they should not be engaged by the machine guns of the attack except when exposed. They are very difficult to put out of action by small-arm fire at any time, and when employed by the defence are sure to be well concealed and provided with cover. It is the duty of the artillery to silence machine guns, and this was so far recognised in the war between Russia and Japan that the latter brought up mountain guns on more than one occasion to silence the Russian machine guns.

At Kinsan on June 26th, 1905, when the Japanese were attacking the position, the Russians brought up two machine guns against the 43rd Regiment and a mountain battery at 3 p.m. The battery at once silenced the machine guns, and by 5.30 p.m. the hill was in the hands of the Japanese.[24] Captain Niessel, of the Russian Army, gives another instance. "It was on August 31st at 7 p.m. that the Japanese decided to drive the machine guns out of the village of Goutsiati by *artillery fire*. Knowing that their infantry had been checked, they posted at the village of Datchaotsiati a battery which showered on us

shrapnel and high explosive shell. Although the men had taken cover behind a wall of earth, we had many wounded and could not breathe freely until nightfall, when the enemy ceased their fire, to which *we could not reply on account of the distance*. At 9 p.m. I was ordered to evacuate the position."[25]

The moment the infantry assault is successful, the machine guns must be pushed forward into the captured position to secure the ground gained and to repel counter-attacks. As the confusion at this moment will be considerable, it will seldom be possible for the machine-gun commander to receive orders from the G.O.C., but this must not prevent him from immediately directing guns to occupy and quickly entrench themselves in positions which it may appear vital to secure, and to order the remainder of the guns not so required to follow and fire on the enemy wherever he may show signs of rallying. In order that these two distinct duties may be carried out instantly and without confusion, it will be advisable to tell off beforehand those batteries that are to pursue the enemy.

Theoretically every available gun should be launched in the pursuit, but the recent war between Russia and Japan has shown how often a position that has been stormed and captured has been retaken by a rapid counter-attack before the attackers have had time to rally and prepare to hold what they have taken. Machine guns can render a position safe from counter-attack so quickly and effectually that this duty should be the *first* consideration of a machine-gun commander with infantry in the assault.

Fresh ammunition must be brought up, and every endeavour made to conceal the guns and construct good cover from any material found in the position.

"During the battle of Mukden, on the evening of March 1st, a position at Sha-shan was captured by the Japanese. The Russians had taken up another position some 500 yards in rear, from which they opened an effective fire upon the Japanese infantry in the captured position. Another Russian force about 1,000 yards further to the west threatened their flank. The Japanese, however, succeeded in bringing up *the machine guns which had taken part in the attack, and brought them into action under cover of a number of sandbags abandoned by the Russians*. The effect was decisive: all counter-attacks failed before the annihilating fire of the machine guns."[26]

IN THE DEFENCE

When infantry are acting on the defensive, it is advisable that the majority of the machine guns should be held in reserve, and used to check turning movements, to reinforce distant portions of the line of defence, and to deliver counter-attacks, but their principal rôle will be the repelling of the assault. Guns allotted for this purpose must be placed in very carefully selected positions in the line of defence, from which they can command narrow approaches, and sweep ground in front of trenches or important works by cross fire, especially any dead ground likely to afford temporary cover to the attackers. Concealment is of the first importance, and cover from fire absolutely necessary, but the combination of the two requires great skill both in choosing positions and in constructing an inconspicuous shelter. In certain positions where the country is flat or undulating and has no abrupt features, pits will be found the best form of cover; but where the ground presents marked features, emplacements providing overhead cover will not only conceal the guns, but

render them immune from shrapnel. The Japanese used these emplacements with great success, the guns often remaining concealed even when the enemy were within 300 yards.

The positions for machine guns should not be in one and the same line, and they should be placed at wide intervals. At least two positions should be provided for each gun, and a second series of positions in rear, commanding those in front, should also be provided. The machine guns should be allotted to their positions by sections, each gun being so placed that its fire crosses that of the other when possible. Section commanders should be responsible for having all ranges from their respective positions taken and written up in each emplacement. They must arrange with the O.C. of that portion of the position to which they are allotted the time and signal (if any) for opening fire; the exact moment should be left to the discretion of the section commander as a rule, the O.C. merely indicating the stage of the attack up to which fire is to be reserved, and great care should be taken not to open fire before this stage has been reached. Every endeavour should be made to ensure co-operation between the machine-gun units in reserving fire till the shortest range has been reached by the attack and a really good target presented. Nothing can justify a machine gun opening fire from a concealed position until its fire will give the best results that can be expected from that place, and to ensure this it is necessary that the target is big and vulnerable, the range close, and the fire unexpected by the enemy. Captain von Beckmann, speaking of the Russo-Japanese War, says: “Premature fire upon unsuitable targets at long range is to be deprecated. The greater the surprise, and the shorter the time within which heavy loss is

inflicted, the greater the morale effect produced. At the battle of Hai-kou-tai on January 27th, 1905, a Japanese company attacked Sha-shan. Four Russian machine guns *opened fire at about 1,100 yards upon the extended firing line, without causing any serious loss or affecting its advance*. On the other hand, the Japanese on March 1st had *approached to within 200 or 300 yards* of the Russian position at Wang-chia-wo-pang and were beginning the final assault. Two Russian machine guns *suddenly came into action*, and the Japanese assault *was repulsed with heavy loss* owing to the annihilating fire."

These two instances well illustrate the right and wrong way of using machine guns in the defence. Where a battery is allotted to one section of the defence the guns should be distributed two or four along the front and one or more on each flank. Single guns may be used in the defence where a section cannot be spared, as the assistance of a supporting gun is not essential to its safety when behind entrenchments. In the first instance guns may be kept in rear of the position until the direction of the attack has been ascertained, provided they are able to occupy their positions unseen.

Machine guns at salients and on the flanks are of great value in defending a position.

If sufficient machine guns are available, one or two batteries should be reserved for the counter-attack. They should in this instance be pushed right into the firing line when necessary and used with the greatest boldness. It will be their duty to cover the retirement of the Infantry in the event of a repulse, and for this purpose positions in rear should have been selected beforehand.

Although the principle of reserving machine guns

in the defence must be strictly adhered to, there may be occasions when the use of a battery or two well in front of the defensive position will compel the enemy to deploy prematurely, cause him loss, and delay his advance. Machine guns so used may also find opportunities for surprising artillery while unlimbering, and thus render great service to the defence. They should be withdrawn when their mission is accomplished, and be reserved for further use as already indicated. The following are examples from the Russo-Japanese War of the use of machine guns in the defence of a position.

General Nogi has written: "Our most formidable foes were wire entanglements placed 100 yards in front of the Russian trenches, well lit up by search-lights and covered by the murderous fire of machine guns. The defenders made use of them to flank dead ground in their front and also had them at other points, kept carefully in reserve and under good cover, to make use of continuous fire against the attackers at the moment of the assault."

"On January 28th, 1905, near Lin-chin-pu at about 7 p.m. the Japanese attacked the forts of Vosnesenski and the trenches near by, in which were posted two machine guns. *These latter opened fire at 200 or 300 yards on a Japanese company in line. In one or two minutes they fired about 1,000 rounds, and the Japanese company was annihilated.*"[27]

"At Mukden on March 1st, the left of a Japanese Division *being within 300 yards of the enemy's position* and about to assault, the Russians suddenly opened a very heavy machine-gun fire from cleverly concealed positions, *causing such loss that the Japanese attack was temporarily suspended*. On August 20th, 1904, the Japanese captured a lunette near the village of Shin-

shi after severe fighting. *The Russians made a counter-attack with three machine guns, and drove the Japanese out again with a loss of over 300.* The three machine guns retired from the lunette before the attackers got home, and, taking up a position behind the open gorge of the work, showered such a hail of bullets on the victorious Japanese that they were compelled to retire."[28]

"On February 27th, 1905, the Russians tried to surprise the railway bridge over the Sha-ho on a very clear night, when one could see as far as 500 yards. Four Japanese machine guns opened fire on a company of the 10th Light Infantry, which was almost wiped out."[29]

At the battle of Hei-kow-tai, the Russians at Shen-tan-pu made no less than five determined attacks against the Japanese entrenchments, in which was a machine gun, but were repulsed each time. The machine gun is said to have done great execution, and *one thousand dead Russians were reported to have been found before it.*[30]

The 8th Division of the Japanese Army are reported to have made several fine attacks upon Hei-kow-tai, *but were each time repulsed mainly by the fire of the Russian machine guns.*[31] The same report says, "Throughout the campaign in Manchuria the Japanese have suffered severely in attacking those points of the Russian front which have been armed with machine guns," and proceeds to quote an episode in the operations of the 5th Division at the battle of Mukden, to show to what lengths the Japanese went in order to silence these weapons. It appears that the Japanese were so galled by the fire of four machine guns that the attack was materially affected. They decided to bring up two mountain

guns to within 500 yards of these machine guns, to try to destroy them. The mountain guns were brought up behind a wall and fired through two holes bored for the muzzles. Two machine guns were at once destroyed, but so well had the others been concealed that they were able to be withdrawn in safety.

Sufficient has been quoted to show that both the Japanese and Russians made the greatest use of machine guns in the defence, and that when employed on sound tactical principles they not only afforded material assistance, but were often the predominant factor. On the other hand, when these principles were neglected or ignored, the machine guns merely wasted ammunition and were impotent to affect the situation. The lesson to be learned is this: *that machine guns are only useful when their tactical handling is thoroughly understood, and then their effect is more decisive than that of any other arm.*

CHAPTER VI

EMPLOYMENT IN THE FIELD WITH INFANTRY (*contd.*)

THE RETREAT

The reply of the British drummer-boy when asked by the great Napoleon to beat the "Retreat," is historical, and, following the traditions of the British infantry, the word will not be found in the index of *Infantry Training*. Nevertheless, although British infantry never retreat, they may be called upon to perform that most difficult operation of war—"a retirement in the face of the enemy."

Field Service Regulations, Part I., 1909, speaking of the retreat says: "The cavalry and other mounted troops, aided by a strong force of artillery, will meanwhile check the enemy's advance, and the remainder of the force, with the exception, if possible, of *a rear guard in support of the mounted troops*, will move as rapidly as possible to the shelter of the rallying position and there reorganise. Steps should be taken immediately *to secure any bridges, defiles, or other vital points on the line of retreat* at which the enemy's mounted troops might intercept the force. Commanders of retreating troops must recognise that their greatest danger will arise from attacks in flank delivered by the enemy's mounted troops and horse artillery; if possible, therefore, they should take precautions *that all ground commanding their line of retreat is occupied by flank guards*."

There are three distinct ways of employing machine guns with infantry to assist in covering the retreat, as will be seen from the portions of the above quoted in italics, viz. (1) With the rear guard. (2) To secure vital points on the line of retreat. (3) To occupy commanding positions on the flanks. The use of machine guns with the rear guard will be dealt with separately, so we will see how they should be employed to fulfil the two latter duties.

Let us suppose that the moment has arrived when the commander of the force decides to break off the engagement and to effect a retreat. We have already seen how the cavalry and their machine guns will co-operate, and we may assume that their intervention will enable the infantry to break off the fight under cover of the fire of the rear guard and their machine guns. In anticipation of this, the commander of the machine-gun batteries—other than those allotted to the rear guard—will assemble them in a central position and receive from the commander of the force his plan of action and instructions for the co-operation of the machine guns. These instructions should definitely state the positions to be occupied on the line of retreat, and for how long such positions are to be held (*e.g.* until the infantry are past such-and-such a place, or to the last possible moment, etc.); but they should leave all details as to unit of guns, fire positions, opening fire, etc., to the machine-gun commander, who should be given a free hand in carrying out his instructions. The machine-gun commander will then issue his orders to battery commanders, allotting the battery for the flank and the battery which is to occupy positions on the line of retreat. In like manner the battery commander will tell off sections to occupy certain positions, if these have already been selected, and if

not he will direct his battery to a position of readiness and will gallop off with his section commanders to select the positions for each section and explain the course of action to be taken. The position of readiness must be in the vicinity of the position to be occupied, and section commanders must take steps to ensure that their sections keep in signalling connection with them and can be brought up by signal to the position selected.

The choice of the position will depend upon the nature of the country and the features favourable to delaying the enemy, but it may be laid down that the machine guns should not be placed in one line, but should be broken up as much as possible, so that no two guns are at the same range. In the same way, guns placed in well-concealed positions on the lower slopes of hills should have the other guns of their sections higher up, where they can command a wide extent of country and at the same time cover the retirement of the guns below. All guns must be so placed that they can be *retired under cover of the ground immediately they move*. The guns on the higher ground will open fire at long range, and the opportunity may be afforded at this stage for using "deliberate" fire at the most rapid rate possible, in imitation of rifle fire, for the double purpose of concealing the guns and deceiving the enemy by causing them to believe that the position is held by infantry. The guns at the lower position should watch their opportunity for opening fire on a large and vulnerable target; but should none be presented, it is possible by reserving fire to catch the enemy in close formation should they press on when the guns have ceased fire, thinking the position has been vacated.

It may be possible to surprise the enemy from close range at bridge-heads or on roads through defiles leading to the line of retreat, if guns are carefully concealed in positions commanding such approaches. Indeed, the opportunities for ambushing pursuing cavalry or infantry will be frequent during the early stages of a retreat, and no chance must be lost in making the enemy pay dearly for his temerity during the pursuit. One successful ambush by machine guns is worth more than the most stubborn stand, for it imposes caution as nothing else can; and caution in the pursuit means delay, and delay spells failure. When machine guns get a really good target at close range, the result is little short of annihilation, and the morale effect of such a heavy loss, totally unexpected and inflicted in a few moments, takes the life out of the pursuit more completely than even a long stand.

The machine guns allotted to the flanks will find positions in the way already described. These positions must be chosen along the line of retreat so as to hold all ground from which fire can be brought to bear on the retreating columns, and from which the enemy can be successfully repulsed when he attempts to break through. If there has been time to form infantry flank guards, the machine guns will assist in strengthening their resistance, and in covering their withdrawal. When acting alone they should open fire on suitable targets at the longest ranges, but when supporting infantry they may be able to reserve fire and surprise the enemy from close range. Guns working together on a flank must keep in touch with each other by signal, and guns should work in sections in mutual support. A battery acting as a flank guard to a force retreating must be

prepared to occupy a front of some two or three miles, and sections will often be in positions a mile apart in open ground. Directly the guns have taken up positions the battery commander should go off with scouts from each gun and select fresh positions along the line of retreat. He will give the signal for retirement, and if in action at the time one gun of each section should move off first under cover of the fire of the others; or where the situation permits, a flank section may be ordered to move first. It must sometimes occur that the cavalry on the flanks will be compelled to retire by a superior force, and when this is the case machine guns in position may be able to inflict considerable loss, should the pursuing cavalry follow them too closely while retiring.

As soon as it is known that the main body has reached the rallying position and is ready to hold it, the machine guns can be withdrawn. This will not usually be possible in daylight, and as a rule it will take place after dark. The dispositions of the machine guns in the rallying positions will be the same as in the case with infantry in the defence.

REAR GUARDS

The prime necessity for the machine guns with a rear guard of a retreating force is mobility, and without this they will be of little service and become a hindrance rather than a help.

“A rear guard carries out its mission best by compelling the enemy’s troops to halt and deploy for attack as frequently and at as great a distance as possible. It can usually effect this by taking up a succession of defensive positions which the enemy must attack in turn. When the enemy’s dispositions are nearly complete, the rear guard moves off by

successive retirements, each party as it falls back covering the retirement of the next by its fire. This action is repeated on the next favourable ground.... A rear guard may also effectually check an enemy by attacking his advanced troops as they emerge from a defile or difficult country."[32]

Machine guns, by reason of their concentrated fire and shallow beaten zone, are peculiarly suited for compelling troops to deploy at long range. They are also suited for quickly taking up a defensive position, and, when mobile, can instantly cease fire and move off in a few moments with considerable rapidity.

Their power for suddenly developing an intense fire will enable them quickly to overwhelm an enemy caught "emerging from a defile or difficult country." It would appear therefore that the machine guns are far more fitted than infantry to perform the duties of a rear guard as quoted above.

"The first consideration in selecting a position for the artillery is that it shall be able to open fire on an enemy at long range, and thus compel his infantry to assume an extended formation at the greatest possible distance. The second is that it should be possible to withdraw without difficulty."[33]

When the infantry arrive within effective rifle range of the artillery, the latter will be compelled to retire, especially if the former are supported by cavalry. This will also be the moment when the infantry will require to retire to a fresh position in rear. Machine guns that have been well concealed, or which have taken up fresh positions in good cover in rear of the infantry line, should be able to unmask and by their fire hold off the enemy until both guns and infantry have effected their retreat. The facility

with which they can traverse and sweep widely extended lines, and instantly concentrate fire on any portion of it, make them of great service in covering a retirement at effective range, as they can render the hottest fire ineffective and aimed fire impossible for a short time.

Machine guns with a rear guard must be prepared to work from place to place with great rapidity, and for this purpose they must arrange to bring the gun horses close up to their fire position. Alternative positions are essential, but must be reached under cover and unobserved by the enemy. Sections will act independently, using their guns in mutual support; but the retirement of one section may often afford another the opportunity, from a well-chosen position on a flank, to surprise the enemy from close range as they press forward to occupy the abandoned position.

A ruse that may sometimes be successful where guns are really well concealed is to bring up the gun horses and retire at a gallop by a pre-arranged signal all along the position, but leaving one gun of each section still in position but flat on the ground, where it will be completely concealed even from glasses. This is almost certain to draw a hot pursuit, especially if the artillery and infantry have retired previously, and if fire is reserved till close range a severe check may be administered to the enemy. “Skilfully laid ambushes will cause the enemy to move with caution in pursuit.”[34]

Machine guns should never retire for a few hundred yards, except where absolutely necessary for covering the retirement of those in front. Once in position, they should only be moved to alternative positions when discovered, and these will usually be

more or less on the same general alignment. When they retire they should move to such a distance in rear as to give them time to select, or if necessary improvise, good cover in the new positions and to replenish ammunition, etc. “The positions should be sufficiently far apart to induce the enemy, after seizing one, to re-form column of route before advancing against the next.”[35]

General Alderson, speaking at the Aldershot Military Society in 1904 and referring to the South African War, said: “I had two Maxims with tripod mountings on pack-saddles, which belonged to the 1st Battalion Mounted Infantry. These guns had well-trained mounted detachments, and a pushing officer, with a good eye for ground, in command. *They were most useful, and more than once saved the flank of their unit from being turned by galloping up and coming into action on the flank of the out-flanking Boers*.... I am of opinion that if the most is to be got out of the guns, the detachments, *even with infantry*, should be mounted.... With the detachment mounted ... there is no question about the guns not keeping up, and they can be sent quickly to any desired position. They can hold on to any such position as long as required to *cover the advance or retirement of their infantry*, and then easily catch them up or get into another position. In fact, if the detachment is mounted the value of the guns is more than doubled.”

Machine guns with the rear guard will certainly be exposed to artillery fire, and they will seldom have the time or opportunity for making sufficient cover to protect themselves. It will be necessary therefore either to withdraw the gun on coming under artillery fire or to find shelter from it. If good natural cover has been obtained, it will only be necessary to lower

the gun flat on the ground behind it, and for the detachment to lie flat close against it, when they will be practically safe. The artillery will cease fire as soon as they find there is nothing to fire at, but the detachment should not move for some time after this, as the guns, having got the range, will be able to inflict considerable damage if the detachment exposes itself.

It is always advisable to keep one or two sections in reserve with a rear guard to be used to protect the flanks or any point where the pursuit threatens to break through in the manner mentioned by General Alderson. These sections should remain with the rear-guard commander and be under his immediate command; they should be in readiness for instant action.

OUTPOSTS

The duties of the outposts are:

(1) To provide protection against surprise.

(2) In case of attack, to gain time for the commander of the force to put his plan of action into execution.[36]

The first duty of outposts, which is *reconnaissance*, cannot be assisted by machine guns; but their second duty, which is *resistance*, may be materially strengthened and aided by them, as we have already seen in dealing with the defence. Little can be said about tactics, and it will be necessary to use the guns in positions on the line of resistance where their fire power is most likely to be of value. In order clearly to understand where and how machine guns should be used with outposts, it will be necessary first to examine the composition and distribution of outposts

of a force of all arms. *Field Service Regulations*, Part I., 1909, says: "When there is any possibility of a force coming in conflict with an enemy, its commander, when halting for the night, should first decide on his dispositions in case of attack, and then arrange the quartering of his command and the position of the outposts accordingly.... Command, co-operation, and inter-communication will be facilitated by placing the advanced troops along well-defined natural features, such as ridges, streams, the outer edges of woods, etc., or in the vicinity of roads, but this must not be allowed to outweigh the necessity for making the best tactical dispositions possible. In enclosed country, and at night, the movements of troops are generally confined to the roads and tracks, which should be carefully watched. If the outpost position is extensive, it may be divided into sections, each section being numbered from the right. The extent of a section depends upon the amount of ground which can be supervised conveniently by one commander. The extent of frontage to be allotted to each company will depend on the defensive capabilities of the outpost position, and, where they exist, on the number of approaches to be guarded. The outpost position will invariably be strengthened and communications improved where necessary. Piquets and supports will do this without waiting for definite orders.... The outposts of a force of all arms consist of outpost mounted troops, outpost companies, and, where necessary, the reserve. Machine guns will generally be included and sometimes artillery.... When stationary, the duty of local protection will fall almost entirely on the infantry, most of the outposts mounted troops being withdrawn, their place in this case being with the reserve, if there be one. In certain cases, however, standing mounted patrols

may be left out at night with advantage....

"Machine guns with outposts may be employed to sweep approaches, and to cover ground which an enemy in advancing may be compelled to pass or occupy."[37]

Machine guns must be used on the principles given above, which naturally fall under two distinct headings, viz. use by day and use by night. Machine guns with outposts by day will not occupy their fire positions unless an attack is imminent, but should be posted with the reserves in their own section of the defence. This must not prevent emplacements or pits for the guns being made, ranges carefully taken and written up, and everything being ready in case of action. These positions and the subsequent action will correspond so closely with those already suggested for infantry in the defence in the last chapter, that they need not be repeated. By night, however, the case is very different, and it is necessary to select very carefully the position of each gun, so that it commands a road, a bridge, or other ground which the enemy in advancing may be compelled to pass or occupy. These places must be selected in order of importance, and an endeavour made to leave no approach by which a body of troops might move uncovered by fire. The machine guns must occupy their positions before dark and be carefully laid to sweep the area of ground necessary for protecting the position, the angle of elevation of the gun being taken by clinometer afterwards in order that it may be relaid if necessary in the dark. Great care must be taken to conceal these guns from observation when bringing them into position or withdrawing them, and it is worth while going to some considerable trouble to do this. One method of

many is suggested to show what is meant. Field guns might be placed in the positions by day and withdrawn before night, the machine guns being brought up on the limbers and dropped in the position behind a screen of brushwood, and withdrawn again in the morning when the field gun is brought up.

The detachment of each machine gun must find two double sentries and their reliefs, who will remain at their posts with the gun, which should have the belt ready in the feed block, but not actually loaded. These men may either take it in turn to stand to the gun or both be directed to watch. When there are no infantry sentries on piquet duty in front of the gun, it will be necessary to detail two who will be posted in the usual way some little distance in front of the gun to prevent it being rushed in the dark. The method of preparing the sights and laying the gun for night work is given in Chapter VII.

The value of machine guns with the outposts at night is shown by an incident at the Battle of Mukden, March 6th, 1905. Two Russian battalions made a night attack against the hill north of Tung-chia-wen, which was occupied by the 2nd Japanese Regiment. There was no moon and the night was very dark. Two Japanese machine guns did great execution at ranges between 50 and 100 yards, and the Russians were repulsed with a loss of 450 men, the Japanese casualties being only 48.

CHAPTER VII

EMPLOYMENT IN FORTRESS WARFARE

The siege of Port Arthur by the Japanese and its defence by the Russians have thrown an entirely new light on Fortress Warfare. Although the main principles of the attack and defence remain unchanged and the primary armament of both is still the heavy artillery, the improvement of small-arms, their great range, and rapid fire have materially altered the nature of the fighting in the later stages and during the assault. The result of this has been to prolong the defence after the fortress has been dismantled by the bombardment, and to render the storming of a single breach an operation no longer possible in war. The machine gun is largely responsible for this; and when high-explosive shells have destroyed the fortifications and disabled the artillery, the stormers will be met by rifle fire and that of machine guns concealed among the ruins of the works. The intensity and accuracy of this fire will be such as to result frequently in the complete repulse of the assault, and even when the glacis of a work has been occupied it may be several weeks before the capture of the work itself is effected.

Machine guns are particularly suited to the defence of fortresses during this period, and Sir G. S. Clarke, in his book *Fortification*, says: “The fire of the Maxim gun, delivering about 700 bullets a minute, [38] can be directed by one man, who need not show

more than his head (easily shielded) above the parapet, the feed being tended by another man completely under cover. In the special qualities of the machine gun there is a distinct advantage to the defence, arising from the fact that *an intense fire over a particular area can be suddenly developed by a few men occupying a small space*. This, in the case of night attacks especially, is a valuable quality. At Port Arthur the Russians in some cases employed machine guns with good effect, concealing them so that their fire came as a surprise to the assaulting parties. Their portability renders them well suited for the defence of positions, and they will doubtless form an important element in the armament of fortresses."

Speaking of the difficulty of "storming" the modern fortress, the same author says: "The *vive force* school proposed therefore—on paper—to shell them heavily and then storm, trusting to incomplete organisation and general unpreparedness. There is little or nothing in military history to bear out the views of this school, and modern experience is entirely against them. Only one such attempt was made in 1870-1, against the indifferent provisional works of Belfort, garrisoned mainly by *Gardes Mobiles* —and this failed completely. The tremendous assaults on the defences of Port Arthur may have been partially inspired by the German teaching; but the results were discouraging, although the devoted and sustained gallantry of the Japanese could not be surpassed and probably would not be equalled by any European army."

The machine guns of a fortress should be divided into two classes—the stationary and the mobile guns. To the former will be allotted the defence of distinct portions of the permanent works, and they will be

provided with cone and parapet mountings,[39] the former being fixed and the latter capable of being moved within the work to which it is allotted.

The mobile guns should be mounted on a light tripod and carried in a low-wheeled handcart, or they may be mounted on a very light two-wheeled carriage capable of being drawn by one man and having wheels of small track, which can move over the narrowest roads in the fortress. These mobile guns should not be allotted to any particular work, but to the garrison other than those within the forts, for use in repelling assaults and making counter-attacks.

We will deal first with the stationary machine guns. It will not be necessary to provide a machine gun for each cone mounting, as the guns can be easily carried from one cone to another as required. Shields should be used with all stationary mountings, but must be detachable, and should not be placed in position until required, as they indicate the situation of the gun and are easily destroyed by artillery.

The positions for machine-gun mountings in a fort must depend on the size and construction of the work, the nature of the outer defences, and particularly on the supporting works in the immediate vicinity. Positions commanding the glacis and the entanglements, on salients of works and enfilading ditches, and any dead ground where the enemy may effect a lodgment, are suitable. Counterscarp galleries at the angles of works flanking the ditch should invariably have machine-gun positions, with a special loophole, long and shallow, to enable them to sweep a wide area with fire.

The selection of the positions for machine guns in

permanent works belongs to the art of the engineer, and there is little that can be said of their tactical employment. Fire should be reserved until the attack has reached close range, and then only opened when the target is large and vulnerable. Guns must be concealed by every possible device and all the loopholes must be blinded. By night all guns should be mounted and trained to sweep ground by which the enemy must approach; when search-lights are not in use, the elevation should be checked by the use of a clinometer and the amount of traverse may be shown by chalk lines on the parapet, or white stones placed in two rows. In this way accurate fire may be brought to bear on the assault on the darkest night, and many night attacks were repulsed with machine-gun fire by the Russians at Port Arthur. Sir G. S. Clarke says: "The front faces of the forts were retrenched in some cases by obstacles and a line of field parapet across the terre-plein. *These, with the assistance of machine guns brought up at the last moment*, enabled assaults of the breaches formed by the mines to be repulsed." Again, "The Russians used machine guns with effect, frequently concealing them in light blindages, so that their positions could not be detected until they were brought to bear upon an attacking force."

The war correspondent Mr. F. Villiers, in his book *Three Months with the Besiegers*, speaking of the storming of West Panlung Redoubt,[40] says: "The death-dealing machine guns of the Russians *in the casemates of the fort* are playing ghastly havoc—such havoc that only a score or more of Ouchi's battalions reached the first ditch of the fence, where they threw themselves panting into the grateful cover of the pits their own artillery have torn."

The number of machine guns allotted to the permanent works of Port Arthur is given as 38 by the United States Official Report, while Nojine, in *The Truth about Port Arthur*, gives them in detail as 28, the distribution of which is shown in red figures on the map at the end of Chapter IX. The ten guns unaccounted for were probably mobile, and used for the defence of the harbour and the various landing-places in the neighbourhood of the fortress.

The mobile machine guns of the fortress will be used on the advanced line of defence with the mobile troops, and should be divided into two—those allotted to the outposts and those allotted to the local reserve.[41] Those allotted to the outposts must be placed in carefully selected positions commanding the approaches to the section of the defence to which they have been posted. These positions will usually be in minor works such as redoubts, emplacements, and lunettes, and they will be selected for their good field of fire, particular attention being paid to their command of dead ground in front of other works. Great care and trouble must be taken in concealing the guns and providing them with good cover, not only from rifle fire, but also from artillery. An endeavour should be made to command all wire entanglements along the front with machine guns, and the angles of traverse of each gun should be carefully laid off and marked in white paint or tape, so that they may be used in the dark accurately to sweep their area of ground. Too much stress cannot be laid on the importance of the accurate laying and sighting of machine guns by day for use at night, and it must be remembered that they are the only weapons which are capable of bringing a rapid and concentrated rifle fire on a particular spot in the dark, and are therefore invaluable to the defence

during a night attack.

The detachments of guns on outpost duty at night should be told off into three watches of two men each, whose duty it will be to remain with the gun in readiness for instant action. The gun should be loaded and laid, and the men on duty should watch the front. Where the gun is in an emplacement or other loop-holed work, one man should watch through the loophole in turns of half an hour at a time. The strain of peering into the dark and listening for the sound of an approach at night is so great that no man should be required to do this duty for more than half an hour at a time, while the chance of a man dozing during a short spell is much reduced and the acuteness of the senses has not time to get dulled. Very strict orders must be given to insure that fire is not opened prematurely; and where infantry sentries are on duty near the gun, it may be advisable not to load the gun, but merely to insert the belt in the feed-block in readiness.

It is always advisable to have the gun ready for any emergency at night, and the following will be found an effective method of preparing the sights for aiming in the dark. Cut a piece of white paper, previously prepared with luminous paint, into the shape of a triangle, and paste it on the slide of the tangent sight so that the apex of the triangle touches the bottom of the V of the sight. Cut also a circular piece of a size that will fit on the foresight just below the tip, and paste this on the foresight. On looking over the sights in the dark, when the luminous ball on the foresight is seen resting on the apex of the luminous triangle on the tangent sight, the gun will be truly laid for the range for which the sight is set.

Machine guns with the local reserves must be light

and mobile; they will be used in a similar way to those with infantry, and to assist in counter-attacks, particularly against the advanced infantry positions and sap-heads of the besiegers. They may also have opportunities of enfilading a trench or firing into a work that has been captured by the enemy. When used for this purpose they must be brought up by hand under cover and open fire at close range from a position that commands the interior of the trench or work, and if possible enfilades it. Great risks are justified in bringing up machine guns for this purpose, as the results of a successful fire action will usually be decisive and far-reaching.

The following is an example of their use in this manner during the siege of Port Arthur:

"On the attack on 203-Metre Hill, machine guns on Akasakayama flanked the position and enfiladed the attackers. Four hundred Japanese were sheltered together in a parallel, where they were completely screened from fire from any part of 203-Metre Hill. Suddenly two machine guns, *which had been concealed on Akasakayama, where they could fire directly into the parallel*, opened fire. Within a few seconds it was turned into a veritable pandemonium, a seething mass of humanity, where men were wildly fighting to get away, trampling on the wounded, climbing over piles of corpses which blocked the entrance, and trying to escape down the coverless hillside. But the Maxims did their work as only Maxims can, and within a few moments practically the whole force was wiped out; a few men were shot dead as they ran down the hillside, but nearly all the others were killed in the narrow trench. It took the Japanese days to extricate and carry away the fearfully intermingled corpses."[42]

There are so many instances of the successful use of machine guns in the defence of Port Arthur that it will be impossible to quote more than a few of the most striking to illustrate the principle on which they should be employed.

At the third general attack on November 26th, at 2 p.m., a large force of Japanese assaulted Sung-shu fort, and having crossed the moat through a bomb-proof passage, they gained the parapet of the rampart and swarmed over it. "Into this seething mass of humanity the machine guns of the forts and batteries on An-tzu Shan poured such a tremendous fire that the attackers were mowed down, crushed, dispersed, and sent head over heels to the moat again in less than half a minute, before a single man had reached the interior of the fort. *The same fate befell a fresh attempt undertaken at five o'clock.*"[43]

Here we see the importance of machine guns being able to command the parapet of neighbouring works, and the necessity of reserving fire until the best possible target is presented, even though the enemy is permitted actually to scale the parapet. The same thing occurred at the storming of Erh-lung Fort. At midnight on November 26th the Japanese "made a desperate attempt to storm the upper battery, but the assailants were mown down by machine guns, *as soon as they appeared on the parapet.*"[44]

This is a good illustration of the use of machine guns at night, and no doubt these guns had been trained by day to sweep the parapet in anticipation of an attack after dark. "On January 28th, 1905, near Linchinpan at about 7 p.m. the Japanese attacked the forts of Vosnesenski and the trenches near by in which were posted two machine guns. These latter opened fire at 200 or 300 yards on a Japanese

company in line. *In one or two minutes they fired about 1,000 rounds and the Japanese company was annihilated.*"[45] During the attack on North Chi-kuan Fort on December 19th, by the 38th Regiment under General Samayeda, which took place at 5 p.m., the men were sent over the parapet man by man from different points, to make it more difficult for the Russian machine gunners. "As soon as there was a little interval in the rattling of the machine guns, a man would jump up and run for his life, and seek shelter behind the débris piled up in the terre-plein after the explosion, or in the holes which the big howitzer shells had made in the ground. Though many of the men were shot down in the short race, little by little a force of about 150 men were assembled in the front part of the fort, and the commander, Captain Iwamoto, then led them against the sandbag trenches at the rear.... The fighting was mostly hand-to-hand, *but the Russian machine guns took an important part in the defence*, their galling fire making fearful ravages amongst the attacking party. The Japanese, therefore, got a couple of mountain guns hauled up on the parapet, and with them succeeded in silencing the Maxims."[46]

Speaking of the use of machine guns in the defence of Port Arthur, Norregaard says: "As an active means of defence the search-light and *machine guns* undoubtedly come in the first rank. The Japanese acknowledge the immense value of machine guns to the defence. The search-lights are stationary, they say, and the ground round Port Arthur is broken, so that they can avoid them; but the machine guns can be moved about anywhere and can easily be shifted from place to place by a couple of men. It is nearly impossible to detect them and put them out of action; their effect on the Japanese was most

disastrous and time after time enabled the Russians to beat off their attacks, inflicting severe losses. Nothing can stand against them, and it is no wonder that the Japanese fear them and even the bravest have a chilly feeling creeping down their backs when the enemy's machine guns beat their devil's tattoo. They shoot with amazing precision even at very long range, and they were splendidly served."

The U.S.A. Official Report on the siege of Port Arthur states: "Machine guns played an important part in the siege, being freely used by both sides.... The guns were used with telling effect against the Japanese in the numerous bloody assaults, *being trained to cover all the approaches with murderous fire*." These last words condense into a single sentence their tactics in the defence of a fortress.

The Russians used the Maxim of ·312 calibre manufactured by Vickers, Sons & Maxim, of London, while the Japanese used the Hotchkiss of ·253 calibre made at the Arsenal at Tokyo. The Japanese had 72 of these weapons at Port Arthur, immediately under the command of the Divisional General, viz. 24 guns with each Division.

The use of machine guns in the siege of a fortress will cover a far wider field than in the defence, and much that has already been written of their employment both in the attack and defence, of positions will apply to the attack on a fortress. It cannot be claimed for machine guns that they are as vital to the success of the besiegers as they are to the garrison, but that they often afford material assistance during assaults, in holding sap-heads and repelling sorties, cannot be denied.

The details of their tactical employment with the

besiegers will differ greatly in accordance with the nature of the operations, and particularly with the situation of the fortress and the surrounding country. In the case of Port Arthur the broken and mountainous nature of the terrain, the deep ravines, and rocky watercourses all lent themselves to the employment of machine guns, and consequently the Japanese were able to make greater use of them than would have been the case under less favourable conditions.

It will be impossible here to do more than briefly indicate how machine guns may be used to assist in siege operations generally, and then show how the Japanese used them before Port Arthur.

"When the enemy's advanced troops have been driven in and the preliminary reconnaissance has enabled the line of investment to be fixed, this line will be divided into sections, to which commanders will be appointed and troops allotted.... Outposts will be established as closely as possible round the fortress in order to cut it off from outside communication and to protect the operations in rear. [47] Machine guns should be allotted to these sections in proportion to their importance in the line of investment. The commander of the section should use them according to the circumstances of the situation, but as a rule a large proportion of the guns should be distributed to the outposts.... The duties of outposts in siege operations are even more important and exacting than they are in the field operations; in the case both of an investment and of a regular siege the brunt of the work throughout will fall upon the outposts.... They must therefore have greater power of resistance than outposts in field warfare in order to prevent the troops in rear from being disturbed by

every skirmish. The outposts of a section which is maintaining a close investment should be about one quarter of the total infantry allotted to the section, together with a proportion of artillery, *machine guns, and engineers*."[48]

The positions for the machine guns should be along the *line of resistance*, which will usually be the piquet line. It will be necessary to provide bomb-proof emplacements for the machine guns, and alternative emplacements should be made for each gun. The temptation to engage in the fire fight must be resisted, and the machine guns should be solely employed for resisting attacks and their fire reserved till close range. Once they have been unmasked, it will be advisable to move them to a fresh position, leaving a dummy gun in the old position.

In the second phase of the siege the machine guns not required for the outpost line should be allotted to the local reserves and the general reserve, and will be used as circumstances require in assisting attacks on outlying works and in repelling counter-attacks. In the third phase machine guns must be pushed up to secure sap-heads and to assist the infantry in the assault; they will be found specially useful in covering the advance of assaulting infantry by sweeping parapets with fire and in securing captured works against counter-attacks. Sandbags should always be carried with machine guns supporting infantry in the assault, and the first consideration should be to secure the guns from fire on reaching a position. It must be remembered that machine guns in siege operations are always exposed to their worst enemy—artillery—and that their only hope of success is by concealment and cover. An example of their use in repulsing a counter-attack at Port Arthur

is given by Nojine in his book *The Truth about Port Arthur*. Speaking of the attempt by the Russians to retake Chien-shan, he says: “The 13th Regiment took two-thirds of it, but could not advance further, as the Japanese threw in heavy reinforcements *and brought up a number of machine guns*. On the night of the 5th we had to withdraw and abandon further attempts to retake the position, as one attack alone had cost us 500 men.”

The following account from the U.S.A. Official Report of the storming of Fort Erh-lung, one of the principal forts of Port Arthur, shows how machine guns can be used to assist in the final assault. “On December 28th the parapet of Fort Erh-lung was blown up at 10 a.m. by five mines being simultaneously sprung.... When the smoke cleared sufficiently, the exterior slope at the salient of the fort was seen to be filled with a dense crowd of Japanese infantry, who closely hugged the ground.... It appears that the Russians had occupied the heavy gun line which lies in the interior of the fort *and with machine guns* raked the front parapet and thus made it impossible for the Japanese infantry to leave their cover on the exterior slope. Meanwhile the Japanese brought up *three machine guns, and with these replied to the Russian fire from the heavy line*.... The bombardment kept up without diminution until about 1 p.m., when it slackened perceptibly on both sides.... About 4 p.m. the Japanese infantry could be seen working along the flanks of the work on the outside of the parapet. The Russians retired to the gorge parapet which had been arranged to fire to the front, and maintained themselves for several hours longer. By 7.30 p.m. the Japanese had fully mastered the position, and the largest and strongest of the permanent works on the front of attack fell into their

possession.... A large number of field and machine guns[49] were included in the spoils of Fort Erh-lung. The assault entailed a loss of about 1,000 men to the Japanese."

During the attack on Wangtai Fort the Japanese used machine guns from the high ridge N.E. of the fort, and thus brought a heavy fire against the Russian interior line.

The Japanese invariably brought up their machine guns with the assault and lost no time in placing them in position to hold captured works. This is indeed their true rôle in the assault, as they will seldom be able to support the actual stormers with fire, but once a foothold is gained in a work, they may be invaluable for the purpose of holding it and thus set free the storming party for another advance.

CHAPTER VIII

EMPLOYMENT IN THE FIELD IN MINOR OPERATIONS

SMALL WARS

Callwell, in his well-known work on this subject, defines the small war in the following terms: “It comprises the expeditions against savages and semi-civilised races by disciplined soldiers, it comprises campaigns undertaken to suppress rebellions and guerilla warfare in all parts of the world where organised armies are struggling against opponents who will not meet them in the open field, and it thus obviously covers operations very varying in their scope and in their conditions.”[50]

The British Empire, “upon which the sun never sets,” is seldom without its small war in some remote part of the globe, and it is safe to affirm that there is never a small war in which the machine gun does not play a prominent part.

Wars against savages or semi-civilised peoples differ fundamentally in principles and tactics from war against a civilised enemy, and the tactics adopted will be governed by the object of the expedition and the tactics and arms of the enemy to be dealt with. Callwell says: “The tactics of such opponents differ so greatly in various cases that it is essential that these be taken fully into consideration. The armament of the enemy is also a point of extreme importance.”

In dealing with machine-gun tactics in small wars, it is obviously impossible to treat with all the situations that may be met with or to attempt to lay down definite rules for their use under all the varying conditions of country, race, and arms before mentioned. It will therefore be sufficient for our purpose to show how machine guns may be used generally in warfare in uncivilised countries, and then to take a single typical campaign to illustrate their employment.

"Against an enemy who fights outside stockades, machine guns are very efficacious; and in any case against all uncivilised people a sudden burst of fire from these is often most paralysing."[51]

After speaking of the jamming of non-automatic machine guns at Ulundi, Abu Klea, Dogali, and Tofreck, Callwell says: "On the other hand, Maxims, which can be easily handled and moved, have done excellent service in East Africa, in Matabililand, and in the campaigns on the North-West Frontier of India. There can be no doubt that machine guns of an easily portable and thoroughly trustworthy class may be most valuable in small wars, and they will probably be freely used in such operations in the future, especially when the enemy is inclined to attack in mass. In hill warfare these weapons scarcely get a proper chance, as they are not very well suited for picking off individuals and as it is dangerous to thrust them too far to the front with the small parties which are so much used in operations of this class. In bush warfare also the want of a fair target is unfavourable to them, and when the shooting is at short range the detachment is likely to be put *hors de combat*, as it offers such a good target; this happened at Owikokaro. An open field of fire

and a well-defined object to aim at are almost more necessary to machine guns than to artillery. On the defensive, machine guns can hardly fail to be valuable. In laager, zarebas, and detached posts of all kinds they are always likely to be of service, and to a certain extent they may take the place of guns for such work. During the operations in Rhodesia in 1896 they were found very useful as a protection to the small laagers left behind by the columns when they moved out for a fight. Two of them did tremendous execution in Chakdara Fort during the siege of that post in 1897. It is interesting to note that at the fight on the Shangani River in Matabililand after the attempt to capture the king had failed, the troops, although they were in a bad position, could not move to a better one for a while, simply because the machine guns would have been thrown out of action during the change of position. Against rushes of Zulus, Ghazis, or other fanatics the effect of such weapons is tremendous, as long as the fire is well maintained. In the excitement of the moment the best infantry may fire unsteadily; but machine guns can be absolutely trusted to commit destructive havoc in the hostile throng, provided that their mechanism does not go out of order."[52]

The above is interesting as showing the wide field for their use in small arms and yet how narrow the method of tactical employment. It may be summed up in a few words: a good target, a good field of fire, constant readiness for action, and sufficient protection to enable the gun to be handled with confidence.

Machine guns should form an integral part of the arm to which they are attached, and must be used with them to supplement their fire power. In attack

they must seek positions from which to bring to bear a concentrated and overwhelming fire on the main body of the enemy, and against savages this must be from the flanks or rear to be successful, as the object is to prevent flight and insure decisive results. Their real value in small wars lies in their enormous defensive powers, which may be employed in clearing the way for columns in enclosed country, in stopping a charge of fanatics whether mounted or on foot, and in preventing small columns on the march from being overwhelmed by superior numbers.

It will be found that, although it is the invariable rule for the disciplined force in a small war to assume the initiative and attack with vigour on every possible occasion, the uncivilised enemy, by reason of his primitive arms and tactics, generally avoids the encounter until he is able to make an attack at a time and on ground of his own choosing. Thus we find the disciplined force thrown on the defensive in the early stages of the expedition and the very heavy losses inflicted then often directly lead to a speedy termination of the campaign. Callwell says: “The tactics adopted by the Zulus and Mahdists when flushed with confidence were best met at a halt in close formation, even on ground where arms of precision could not tell with full effect. In the jungles of Dahomey the sudden hostile attacks on flanks and rear could be confronted most satisfactorily by the troops on the spot acting on the defence until the edge was taken off the hostile appetite for combat.... Where a small force of regular troops is opposed to great hostile masses, no matter how ill-armed or how deficient in morale the masses may be, circumstances render it almost imperative to act on the defensive.”

For this reason alone machine guns form the most

valuable arm in encounters of this nature, and their tremendous effect cannot be better illustrated than at Omdurman, where they literally mowed down the attacking masses in great swathes.

The first consideration when employing machine guns in a small war is the method of carrying the gun and its ammunition, which must be suited to the country in which the operations are to take place.

In the majority of cases it will be found that the usual transport of the country is the most suitable, and a tripod-mounted gun can be adapted to almost any form of carriage. In mountainous open country such as the North-West Frontier of India mules or ponies are suitable; in the desert the camel has been used; while in the forests of East Africa machine guns have been carried by porters on their heads, strapped on their backs, or slung beneath a pole by two men. Whatever method is adopted, it is essential that the gun can be brought into action easily and quickly, and that it is at least as mobile as the troops it accompanies.

The operations in Somaliland in 1901-4 are an excellent example of one of our typical small wars, and will serve to illustrate the use of machine guns against a savage enemy in a bush country.

The camel is the transport animal of the country and riding camels were used to carry the machine guns with the infantry of the force. In the first expedition, under Lieut.-Colonel Swayne, there were three Maxim guns—two of which were ·450 bore and one a ·303. On June 2nd, 1901, Captain McNeil, who was left in zareba at Smala to guard the live stock, was attacked by about 3,000 Somalis, who increased to about 5,000 on the 3rd. His force consisted of three British officers and 500 native troops, many of

whom were native levies and only 370 of whom were armed with rifles. There were about 3,500 camels, 100 horses, and some cattle and goats in a separate zareba from the men who were above and able to command it. The Maxim, under Lieutenant Younghusband and served by Somalis, was placed on a cairn of stones at the top of the men's zareba and commanded a good field of fire all round. The ground was fairly open all round, and clear of bushes for about 150 yards from the zareba. Before the camels could be driven in, the enemy's horsemen appeared and threatened to capture a large head of camels, to prevent which a section under a Jemada was sent out to try to keep off the enemy until these camels could be driven in. Captain McNeil says: "I supported him by turning the Maxim on the nearest horseman.... Some of the horsemen had got round by now a good way out, but by keeping the Maxim on them, supported by long-range volleys from the Punjabis, we did much to check them."[53]

On June 3rd at about 9 a.m. a very large force of footmen attacked in one long line several ranks deep and enveloped the south and west sides of both zarebas. They came on at a steady pace and opened fire at about 400 yards. Fire was reserved until the enemy were at about 500 yards range, when heavy fire was opened by both rifles and Maxim, with the result that no one got within 150 yards of the zareba, though they advanced most pluckily. 180 dead were found around the zareba, and the enemy's loss was estimated at 500.

The danger of rushing machine guns up to the front while still mounted is shown in an incident that occurred on June 17th during a successful attack on the Mullah's villages near Feriddin. During the

reconnaissance the mounted corps became somewhat heavily engaged, and Colonel Swayne sent forward the reserve company and the Maxims to bring fire to bear from a commanding spur about two miles to the front. On reaching the spur they came under a heavy fire, and the Maxim camels and some ponies were shot down. The Somalis, however, were able to disentangle the Maxims from the dead camels and bring them into action on commanding ground.[54] Colonel Swayne, in his official report, said: "Mekometers were badly wanted for the Maxims.... The Maxims had a trick of jamming at critical moments, but were quickly set right again. The fault may have been due to the belts."

When the Maxim gun jams without a breakage of the mechanism, the fault is usually want of experience on the part of the gunner.

During the third expedition the machine guns were increased to eleven and were carried by porters with the infantry.

The disaster to Colonel Plunkett's force at Gumburu on April 17th was due to ammunition running short. The force, consisting of about 200 men with two machine guns, was attacked by a large force of horse and foot. They at once formed square, and took up a position in an open spot surrounded by dense bush at from 300 to 600 yards' distance. For some two hours they were able to hold off the enemy, but on the ammunition being exhausted they were overwhelmed.

On April 22nd, 1903, Major Gough's force of about 200 men with one machine gun was attacked in thick bush by a large force under very similar conditions to Colonel Plunkett. The attack began at 10.30 a.m. from all sides, and was continued with

great determination until 2 p.m. Square was formed, and fire opened at very close range (20 to 50 yards), owing to the dense bush. "The Maxim, under Sergeant Gibb, was moved from place to place as occasion arose, the enemy always giving way when it opened fire."[55]

In the fourth expedition, under General Egerton, the ammunition per machine gun was 30,200 rounds in garrison, 10,400 rounds with the brigade, and 2,200 rounds in second-line transport; 6,000 rounds with each gun was carried ready in belts.

During the action at Jidbali on January 10th, 1904, the force engaged, which consisted of about 2,500, including native levies, the infantry, about 1,299 strong, formed the usual hollow square round the transport. The enemy consisted of the pick of the Mullah's fighting Dervishes, and were about 6,000 to 8,000 strong. The Dervishes advanced in regular skirmishing order, rushing from cover to cover, and lying down. A few got within 400 yards of the square, *but were unable to face the heavy rifle and Maxim fire that met them*, and this attack failed. Then two determined rushes were made on the front and right flank of the square, *but they were met with such a terrific fire from rifles and Maxims that the charging enemy could not face it.* At 10 a.m. the whole mass of the enemy broke and fled, followed by fire till it was masked by the pursuing mounted troops. Six hundred and sixty-eight dead were counted round the position two days later.[56]

"*Much execution was done by the Maxim worked in the right corner of the square by Sergeant Gibbs, 1st Bn. King's African Rifles, on the groups of Dervishes taking cover behind the scattered clumps of bushes surrounding the square. One entire group of nine men was wiped out*

in a moment by this Maxim."[57]

It will be seen that machine guns are a very useful auxiliary in bush warfare, especially in holding posts and defending squares from the rush of fanatics. They must always march with the main body of the arm to which they are attached, and be used as circumstances require. A high state of efficiency in working the gun, a thorough knowledge of its mechanism, and ability to bring it into action with great rapidity are of more importance in bush warfare than tactical handling, which is usually of the simplest description.

MOUNTAIN WARFARE

"The principle of always having bodies of men in rear or on the flanks, covering by their fire the advance or retirement of the troops nearest the enemy, is specially important in hill fighting. On nearly every ridge and spur positions will be found where this can be done, and advantage can also often be taken of parallel features, from which covering and cross fire may be used with effect."[58]

It will seldom be possible to make much use of machine guns with the advanced guards, as mountaineers usually oppose the advance by bands of skirmishers who fire from the cover of rocks and scattered sangars, and while affording a bad target to the machine gun, can quickly put it out of action by concentrating their fire upon it. They are also unsuitable for piqueting the heights, on account of the difficulty of getting them into position and of rapidly withdrawing them again. They are, however, very useful to strengthen small fortified posts on the lines of communications, and for the defence of camps by night, being trained by day and the sights

prepared as suggested in Chapter VII., page 150. Callwell says: "It is a good plan, if night attacks are at all probable, to train guns and machine guns by daylight upon points where the enemy may be expected to mass, or from which assault is to be anticipated. *This was done at the defence of Chakdara in 1897 with excellent results.*"

Machine guns are invaluable to the rear guard of a force retiring, which is an exceedingly difficult undertaking in mountain warfare, because hillmen invariably await this opportunity to swoop down and make a vigorous attack. The very nature of the operations necessitates frequent retirements. Callwell says: "Columns have to visit outlying valleys for punitive purposes, and must then rejoin the main body; and even when penetrating into the heart of a hostile mountain district, the rear of the army, as it passes successively the homes of different tribes and clans, draws these down upon it, and, as a result of the general direction of its march, retires before them."

Field Service Regulations, 1909, speaking of rear guards in mountain warfare, says: "Mountain artillery should usually form part of a rear guard, *and machine guns may be usefully employed.* The withdrawal of the artillery is usually an encouragement to the enemy to press on, and on such occasions machine guns will often find scope for action...." "If the rear-guard commander considers it impossible to reach camp before nightfall, it will generally be advisable for him to halt and bivouac for the night in the most favourable position for defence." Here, again, machine guns will be most useful in defending the bivouac after dark if trained by daylight to sweep approaches, while the

morale effect of its accurate fire in the dark will be considerable. There are many instances from our wars on the North-West Frontier where machine guns might have been used profitably in covering the retreat; but to be successfully employed in such cases, they must be far more mobile and better trained for rapid-fire practice than they have been in the past. Lieut.-Colonel Haughton's retreat from the Iseri Kandeo Pass is typical of such operations. "A brigade had been sent on detached duty into the Warais Valley, and after completing its work there was rejoining the rest of the army in Maidan. In doing so the brigade had to cross the Iseri Kandeo Pass over the hills which separate the two valleys. As the force quitted its bivouacs the Ghurkas were left as rear guard, while the 15th Sikhs were told off to hold the Kotal, which was about half-way. The main body and baggage moved off early, and the latter reached the maidan almost unnoticed. The Ghurkas, however, were pressed from the commencement of the retirement right up to the top of the Kotal; then they marched on, leaving the 15th Sikhs to cover the retirement. As the Sikhs began to draw in their piquets from the heights above the pass, the Afridis, as was their wont, grew bolder and bolder, and, taking advantage of the cover of a wood hard by, they crept down close to the rear guard. One company as it withdrew was suddenly charged by a crowd of swordsmen.... But those who participated in this rush paid dearly for their temerity, the Sikh company meeting them with steady musketry and being most opportunely reinforced by another company. The carrying off of the wounded was, however, becoming a matter of serious difficulty, so reinforcements were asked for. These arrived in the shape of two companies of Dorsets and of several

companies of the 36th Sikhs under Lieut.-Colonel Haughton, who assumed command, and who withdrew his force down the hill without much loss."[59] It is easy to imagine how machine guns might have been used here, and how their presence might even have rendered the reinforcements unnecessary; but unless they are capable of coming into action and opening fire in thirty seconds, and of packing up and moving off again after ceasing fire in the same time, the rear guard in mountain warfare is no place for them and they had best march with the baggage.

During the expedition to Tibet some trouble arose with the machine guns owing to the extreme cold, which not only froze the water in the barrel-casing of the Maxims, but froze the lubricating oil in the lock and recoiling parts and thus rendered the gun useless. When very low temperatures are encountered in high latitudes, alcohol or spirit should be added to the water to prevent it freezing; and as potable spirit is liable to "evaporate," a little paraffin oil should be added. Glycerine may be substituted for lubricating oil in temperatures where even Russian petroleum will freeze.

CONVOYS

Callwell defines a convoy as "a column of non-combatants guarded by a comparatively speaking small escort." The object of this escort is to hold off all hostile parties and to get the convoy to its destination in safety. Escorts will generally have to be reduced to the smallest possible size in order not to deprive the fighting force of men. They will therefore always act on the defensive, while endeavouring to keep moving with the convoy,

which will only be halted when compelled to do so for its own safety. When the escort consists of the three arms, machine guns may be used to reduce the number of infantry required very considerably, while adding to the defensive power of those necessary.

In minor operations where every available rifle is required with the fighting force, machine guns will be found invaluable to replace infantry. Their exact position with the convoy must depend upon its composition and length and the number of guns available. The principle of having a machine gun, or where possible a section, at the head and another at the rear end of the line of wagons or pack animals is sound, as these are the vital points, and an attack on the centre can be met by a cross fire from these positions. If the convoy is unduly long, another gun or section may be placed in the centre. Should it be necessary to form laager, the machine guns in the front and rear enable this to be done under their converging fire. Where wagons or carts are used and the enemy is unprovided with arms of precision, machine guns may be mounted on the tops of wagons, so that they can open fire instantly and fire while moving forward with the convoy; this position not only provides them with a good field of fire, but also affords protection to the detachments from a sudden charge home of savages from an ambush.

"The success of an attack upon a convoy usually depends upon the defeat of the protecting troops. This will involve a combat, which will be governed by the principles already laid down in this manual.... If fighting is inevitable, the enemy should be engaged as far from the convoy as possible."[60]

For this reason machine guns should open fire on any body of the enemy presenting a good target,

even at long range, if they are moving to attack the convoy. The presence of machine guns with a convoy will free the infantry to move out wide on the flanks in open country, and to push ahead to piquet hills, clear bush, and occupy heights on the line of march, without exposing the convoy to danger during their absence.

BLOCKHOUSES

Blockhouses have been much used in warfare in uncivilised countries ever since the introduction of firearms, to enable small detachments on a frontier or on the lines of communication to maintain themselves in the midst of the enemy when unsupported by other troops, and also to form a chain of posts across an enemy's country for the capture or suppression of guerilla bands.

Looking back to the South African War, it appears inexplicable that little or no use was made of machine guns to hold the long blockhouse lines which stretched for so many hundreds of miles in every direction during the latter stages of the war. Time after time the Boers succeeded in breaking through this line, even in places where the blockhouses were within effective range of each other and the intervening space guarded by elaborate barbed-wire entanglements. The reason for this is not difficult to discover. Screened by the darkness, the fire of the small garrisons of these blockhouses was neither sufficiently powerful nor accurate to stop the majority of the enemy from breaking through, even though stopped by the entanglements and compelled to use a single gap. The annihilating and concentrated fire of machine guns which had been laid by day to sweep the entanglements should

render the forcing of a similar blockhouse line impossible in the future. Machine guns in detached blockhouses should be sited as low as is compatible with a good field of fire, and should have long narrow loopholes prepared for them for at least two positions on every face. Constant change of position within the blockhouse after firing will prevent the enemy from being able to "snipe" the gunners through the loopholes.

The great variety of conditions and circumstances under which minor operations take place renders it impossible to do more than show how they may be used in certain selected instances. The machine gunner must be prepared to modify and adapt his tactics to suit the special circumstances of the expedition with which he is employed, and he cannot do better than study Callwell's *Small Wars, their Principles and Practice*, which has been so freely quoted in this chapter.

ENCLOSED COUNTRY

This chapter would not be complete without some reference to the use of machine guns in enclosed country such as is found in the United Kingdom. Clery, in his *Minor Tactics*, p. 118, says that cultivated country is the most favourable to the attack, while in defence the country to the front cannot be too open. "In the first, infantry gains a succession of covered positions by means of which it comes on more equal terms with the defence. In the second, the infantry of the defence has a clear field to destroy the assailants as they approach."

Apart from civil war, the only possible occasion for the use of machine guns in the British Isles is against an invader, and it is well known to students of

modern war that the prospects of a successful invasion do not depend upon the strength or weakness of our fleet, but on that of our army for home defence. The duty of a fleet in time of war is to go to sea and destroy the enemy's ships, and while it is absent on this mission an opportunity for invasion may occur, the success of which will wholly depend upon the force the invader will meet on landing.

The Japanese recently landed in Manchuria in spite of Russia's superior naval strength; but because it was the case of an island invading a continent, we do not apply the lesson to ourselves, and are content to believe that a continent cannot invade an island.

It is obvious to the military student that no invasion will be attempted unless its success is reasonably certain, and the presence of four divisions of regular troops at home renders such an enterprise extremely difficult, if not impossible, without permanent command of the sea. But these four divisions are not the Home Defence Force, and form that part of our Expeditionary Army for service outside the United Kingdom. We may, therefore, rest assured that as long as we retain command of the sea, no invasion can take place until we are involved in an over-seas war which requires a more or less large portion of our Expeditionary Force—an event which has happened almost every decade.

It will be safe, therefore, to assume that in the event of an invasion we shall have to rely on our Territorial Army to meet the enemy, and it will be doing this force no injustice to assume that they will be compelled to act on the defensive in the face of a highly trained and disciplined Continental Army. Indeed, it is difficult for a soldier to realise how a Volunteer force, trained for fourteen days in the year

and unacquainted with military discipline, can hope to meet on equal terms, even if superior by three to one in numbers, the pick of Continental manhood trained under an iron discipline for the minimum of two years.

Be that as it may, it is necessary to realise the difficulties to be faced, not the least of which is the question of *training*, for, as already pointed out, it is absolutely essential to the successful use of machine guns that the personnel should be very highly trained, and this applies to their use in enclosed country even more than elsewhere.

Although as a general principle enclosed country benefits the attacker and is disadvantageous to the defender, this is not always the case with machine guns, and provided the golden rule of "concealment, cover, and surprise" is intelligently applied, enclosed country is particularly suited for the use of machine guns in the defence.

For this purpose machine guns should be trained to work in pairs in mutual support. They must be so mounted that they can be carried by hand for considerable distances into position, and must be capable of firing from a low siting when they must be inconspicuous. If mounted, as at present, on a wheeled carriage, a light tripod may be carried on the carriage, which will render the gun far more inconspicuous and useful.

While all the principles for the tactical handling of machine guns with infantry hold good, there are several points of importance to be noted in using them in the defence in enclosed country. The advance of any formed bodies of the enemy will be confined to the roads; consequently machine guns must endeavour to command all roads leading from

the enemy, especially where they become defiles.

The hedgerows, standing crops, woods, and lanes must be used to afford concealment in advancing or retiring from position to position, and scouts must be specially trained in finding the easiest *concealed* way from field to field by gates, gaps, or through stiles. The way from the road or lane to the selected position must be always marked by sticks or broken branches which are placed to indicate the direction of gates or gaps, or where a turning has to be made. The usual procedure will be for the scouts to work across country on one or both sides of the road. The section commander, who should be mounted, will select the position for the guns, and scouts from each gun will be sent out to guide them to the positions. The carriages and ammunition cart must move up the road to the nearest point to the position, and scouts should select and mark the easiest way to the carriages. Careful co-operation between the guns and carriages will often enable the latter to greatly facilitate movement, by pushing up by-lanes or across fields to a position near the guns. Ammunition will usually have to be carried to the guns by hand, so that great pains must be taken to get the cart as near the position as possible. The selection of the position will be governed by the facilities it presents for surprising the enemy in close formation at effective range. The range must be accurately found, and fire must only be opened by order of the section commander. In selecting a position care must be taken that it offers perfect concealment from view, and that the guns can retire under cover to their carriages. The neighbourhood of conspicuous objects, such as single trees, a gap in a fence, etc., must be carefully avoided, and care must be taken to secure a good field of fire for as great a distance as possible to

the front, while the flanks and any cover within effective range which the enemy might occupy must be watched by scouts. It is in this matter of careful reconnaissance, of selecting ground and occupying or watching all neighbouring cover, that the successful use of machine guns in enclosed country mainly depends. The enemy is obliged by the nature of the country to move in close formation to pass defiles, roads, gaps, or to avoid crops, woods, and villages, and it is the intelligent anticipation of where this will occur that gives the machine gun its chance for decisive action. The hedges, orchards, lanes and woods, and other features will afford endless opportunities for bringing *flanking* fire to bear on the enemy. Nothing is so effective, and the morale effect on an enemy who is enfiladed at close range renders it usually decisive.

Cover will generally be provided by the spade, and ditches require little work to turn them into excellent pits, the only thing necessary as a rule being to excavate a hole in rear for the back leg of the tripod. Where there is a ditch with a hedge in front of it, the ditch should be improved so as to provide a pit for the gun to fire through the hedge about six inches above ground level. If the hedge is too thick to fire through, it should not be cut down, but a hole should be cut in the growth for the muzzle of the gun sufficiently large to aim through. If it is necessary to cut a gap in the hedge, the growth should be cut through close to the ground, but *without removing it* until the moment for opening fire.

Alternative positions in the same hedgerow should be avoided, as it is certain to be discovered immediately, and the range is probably already known.

The edge of the wood, if it commands suitable ground, is an excellent position for machine guns; but if the carriages remain in the wood they must be provided with cover. When time and material are available, a good field of fire may be obtained by erecting a platform ten to twelve feet above the ground in the trees, and placing a machine gun on this; not only is the field of fire much increased, but the gun will be almost impossible to discover. This was done on one occasion in the Spanish-American War, when it met with considerable success.

When machine guns are used for the defence of villages or farms, they should be placed outside the village or farm buildings well clear of the walls. The salient angle will usually be the most suitable place, a good field of fire being the chief object. The guns should be placed so as to flank one side of the village, and must be most carefully concealed, a pit being usually the best form of cover. Walls should as a rule be avoided, as they are very easily destroyed by artillery fire and always afford a conspicuous target.

When time permits the pits should be deepened and hollowed out in front to afford the firers protection from artillery fire. Similar protection may be provided for the rest of the detachment by making a narrow and deep trench connected with each side of the gun pit. Should it be necessary to defend the village to the last, a second position should be provided in the centre of the village, commanding the main avenues, and the church tower, or roof, may afford a suitable site, provided artillery is not present.

Although machine guns have never been used in England, they were employed by the French in 1871

during General Chanzy's retreat from the Loire to Le Mans with great success, and this campaign is particularly interesting to us because the country greatly resembles England. Dr. Miller Maguire, in his lecture given at the Royal Artillery Institute on this campaign, quotes the German official account as follows: "The entire country is covered with the densest cultivation of long-standing growth, with vineyards, orchards, and vegetable gardens.... Owing to the extensive subdivision of land customary in this country, every property is surrounded by hedges, ditches, and walls. There are, consequently, numerous positions and isolated points at which even moderate troops could defend themselves behind good cover. Although the superior effect of the chassepot here ceased to avail, *the mitrailleuses were in their true element*, and became a dangerous weapon in the narrow passes." Dr. Maguire remarks: "I do not know how far you will be inclined to apply those remarks to the circumstances of your own country in the event of invasion. It might be a good lesson to try; for the several arms could be handled between Dover and London step by step." Later on he quotes from a British officer, who says: "In fact, Kent and Surrey combined, with vineyards instead of hop gardens, would be an exact picture of the country through which the Germans were pushing on."

There are numerous instances in this campaign where the mitrailleuse caused great loss to the Germans, and enabled the French to delay their advance and hold on to villages and positions with greatly inferior forces.

Remembering that the mitrailleuse of 1870 was a clumsy and primitive weapon, worked by hand and

mounted on a field carriage, there is every reason to suppose that the modern automatic machine gun, on its light and mobile tripod, will be still more valuable in fighting in enclosed country.

CHAPTER IX

MACHINE GUNS IN THE ARMIES OF THE WORLD

AMERICA (UNITED STATES)

GUN.—At present there are three machine guns in use in the United States, viz.:

(*a*) The Gatling.
(*b*) The Maxim Automatic.
(*c*) The Colt Automatic.

(*a*) *The Gatling.*—Calibre ·3 in., and takes the service rifle bullet. It has 10 barrels, and is fed by a rotating cylinder. The gun is mounted on a shielded carriage with limber. The rate of fire is about 600 rounds per minute.

(*b*) *The Maxim Automatic.*—This is similar to the one in use in our own service, and takes the ·3 in. U.S. service ammunition.

Mounting.—For infantry and cavalry, a tripod mounting. For use in fortified works, a two-wheeled shielded carriage.

The transport is by means of pack-animals. A complete outfit consists of five packs, *e.g.* the gun and tripod form one pack, and the remaining four packs carry 1,500 rounds of ammunition and accessories for the gun, including water for filling the water-jacket.

For firing blank it is fitted with an attachment

called the “drill and blank-fire attachment.”

(*c*) *The Colt Automatic.*—Calibre ·3 in., and takes the service rifle bullet. The gun is fed by means of a cartridge belt, and fires 400 rounds a minute.

The weight is 40 lb., and the gun is mounted either on a tripod mounting or a wheeled carriage.

A “silencer” for the Maxim was tested in March, 1909, and the results compared with those obtained from the gun without the silencer. As regards accuracy of fire there was nothing to choose between the two. The silencer, however, reduced the noise to that of a ·22 in. long cartridge, and when used at night the flash was entirely obliterated.

ORGANISATION.—*Infantry.*—One battalion in each regiment has a machine-gun platoon consisting of 1 sergeant, 2 corporals, and 18 privates, and 2 guns.

Cavalry.—In a regiment of 3 squadrons, 1 squadron has a machine-gun platoon of 3 corporals and 18 privates.

AUSTRIA

GUN.—In 1907 after prolonged trial the Austrians definitely adopted the Schwarzlose. It is a very simple weapon and very reliable, firing 375 rounds per minute from a tripod mounting.

ORGANISATION.—A section of machine guns is attached to each regiment of cavalry and infantry; there are also mountain companies of machine guns.

With infantry the section consists of 2 guns; 10,000 rounds are carried per machine gun. The detachment consists of 14 men per gun, 7 for actually working the gun and 7 to lead the horses. There are 7 horses to each gun, of which 1 carries

the gun and 500 rounds, 5 carry from 1,500 to 2,000 rounds each, and 1 carries the shields. There is also a spare horse. For hand transport one man carries 2 belts of 250 cartridges, another the gun and 1 belt, a third the mounting and 1 belt, a fourth 2 belts, a fifth the water-jacket, etc. The shields are left on the horse. It will be seen that when the machine gun is taken forward in this way it has ready for immediate use 1,500 rounds.

With cavalry the section consists of 4 guns without shields. On account of the great independence of cavalry, the machine guns have with them 15,000 rounds each, of which 5,000 are on pack-animals and 10,000 in wagons. These wagons usually march in rear of the column. The detachment, which is all mounted, consists of 9 men per gun with 4 pack-horses (1 for the gun and 3 for ammunition). Hand transport is provided for as with the infantry machine guns.

The mountain machine-gun company consists of 3 officers and 64 other ranks. There are 4 guns carried on pack-horses, with 2 pack-horses per gun for ammunition (4,000 rounds per gun).

TACTICAL (taken from a précis of the Austrian Regulations, 1908; published in *Streffleurs militärische Zeitschrift*, April, 1908).—(*a*) *With Infantry.*—During the advance it is well to give some machine guns to the principal units of the covering force, for they add to their resisting power, and in the many phases of the preparatory fight they are sure to have opportunities of effecting surprise. The place for the section leader is then near the O.C. detachment. When the machine guns leave the column it is always advisable to detail a few cavalry to cover them.

To take up a position it is necessary to observe the following:

(1) To manœuvre out of sight of the enemy. This will often necessitate unloading and carrying forward the *matériel* by hand.

(2) Not to keep the guns too close together, which may cause additional losses. The "position of observation" will play an important part in the machine-gun fight.

The narrow effective zone of the machine guns allows them to fire over the heads of other troops. Such fire will be advantageously employed when machine guns occupy high positions. But it is only allowed at ranges greater than 1,000 yards, and when the troops over whom they are firing are at least 400 yards from the guns. Under these circumstances the use of searching fire is forbidden.

Both in attack and defence it is necessary to remember that machine guns are not suitable for a continuous fight of long duration. If during the preparatory fight the machine guns have found opportunities of opening fire, they ought, when the general engagement has begun, to be withdrawn from the firing line and held ready to act again under certain circumstances of importance.

These circumstances are:

In attack: to act on the enemy's flank to facilitate the infantry advance; to open fire on the decisive point, whether flank or front, from a dominating position, either over the heads of the infantry or by carrying the machine guns up into the firing line.

In defence: to reinforce threatened points; to stop enveloping movements; to repulse an assault; to take

part in a counter-attack.

In most cases these tasks will necessitate the machine guns being at once carried into the firing line to fight side by side with the infantry.

(*b*) *With Cavalry.*—The rôle of machine guns with cavalry is thus determined:

(1) To take part in dismounted action: if pushed forward, they allow the number of men dismounted to be limited; if kept in reserve or pushed against a flank, they facilitate the success of the frontal attack.

(2) To add considerably to the offensive and defensive power of patrols by replacing the battalions of chasseurs which used to be attached to the cavalry.

(3) Finally, to take part in the cavalry fight; for this they should be judiciously divided among the troops of the advanced guard, and should make use of their mobility. This will allow them to open fire from well-chosen positions before the moment of contact, and help to obtain the desired result.

The place for the machine-gun commander is near the General. If the machine guns have been well placed in the column, they will—thanks to their mobility, which is equal to that of any cavalry detachment—be able to make use of the considerable time required by a large force of cavalry to get into battle formation.

Whereas with infantry the surprise of the enemy is always effected by making use of the features of the ground, the best method for cavalry guns is to utilise their rapidity of motion and their resemblance to other cavalry units, for which at a distance they are easily mistaken.

The widest power of initiative is left to the commander for the grouping of his units in the fight. Very often he will only bring up near the firing line the horse carrying the gun and one carrying ammunition, in order to be able to escape rapidly. At other times all the horses will be brought up close under cover. At others the whole section will dash up to their position at full speed; the guns will be unloaded at once, and the horses will disappear to the rear. The one important thing is to open fire as a surprise.

To sum up: the Austrian Regulations only confirm the rules already laid down by very competent writers who have published works on the subject. They enunciate in a clear and concise form the principles which should govern the employment of machine guns in various circumstances, laying particular stress on the necessity for constant readiness for action in a position of observation.

In *Les Mitrailleuses à l'Etranger* Lieutenant M. quotes certain Austrian officers who, writing before the publication of the Regulations of 1908, considered that the value of machine guns lay chiefly in their use as a reserve of fire. Lieut.-Colonel Berndt says: "In offence, as in defence, machine guns must be held back as a reserve of fire to be used at the moment when the rapid development of heavy fire is required." Lieutenant Binder is of the same opinion, and also recommends their being used in the closest co-operation with the infantry. Lieutenant Hayeck-Liprandi, a cavalry officer, fully realises the importance of machine-guns, as relieving cavalry to a large degree of the necessity for dismounted action. He also advocates the attachment of machine-gun sections to regiments at the disposal of the

regimental commanding officer.[61]

CHINA

GUN.—The Chinese have bought numbers of Maxims for attachment to their infantry. With cavalry they have adopted the Madsen.

Their organisation is at present in process of evolution, and no official views on their tactical employment have been published hitherto.

DENMARK

GUN.—In 1904 Major-General Madsen, the Danish War Minister, invented the Rekyl (recoil) machine gun. The gun weighs only 13½ lb., is not much longer than the service rifle, and in case of need can be served by one man. It has a rate of fire of 750 rounds per minute with a muzzle velocity of 2,350 ft. per second.

ORGANISATION.—Every Hussar Squadron in the Danish Army is to have a section of three guns attached. The gun is carried on a horse together with 300 rounds of ammunition, and with each gun there is a led horse with reserve ammunition.

TACTICS.—The gun detachment can easily and rapidly follow all the movements of the body of horse to which they are attached, even through woods. It is therefore argued that the possession of this weapon will do away with the necessity for dismounted cavalry action.

FRANCE

GUN.—France has adopted both the Puteaux and Hotchkiss patterns of machine gun without shields. With cavalry the question of mounting has not yet

been definitely settled, but experiments have been carried out with wheeled carriages drawn by four horses. The infantry sections have been provided with a tripod mounting (70 lb.), which can be adjusted to two heights, either 1 ft. 6 in. or 2 ft. 6 in. above the ground.

ORGANISATION.—At present (1909) every brigade, both of cavalry and of infantry, has a two-gun section attached. It is intended to provide every regiment with a section as soon as possible.

With cavalry the detachment for each gun consists of 24 men, who are all mounted. The carriage carries 16,500 rounds of ammunition in addition to the gun.

The infantry section is commanded by a lieutenant, who has under him one N.C.O. and 23 men, armed with rifles. There are two gun horses, which each carry a gun, tripod, and one box of ammunition; and eight ammunition horses, which each carry seven boxes, three on each side and one on top. A box contains 150 rounds, so that each section has 8,700 rounds. The "Souchier" telemeter is carried.

TACTICAL.—The French Regulations are at present under consideration, and the tendency seems to be to follow the principles laid down by the Germans.

M. le Commandant Niessel, in his preface to *Les Mitrailleuses à l'Etranger*, by Lieutenant M., says: "There is one principle which should dominate the whole subject and never be lost to view. It is that machine guns are condensed infantry, and that therefore it is as infantry that they should be used in battle. Together with accuracy and power of fire, the characteristic which should especially distinguish infantry in battle is their utilisation of every feature

of the ground. Machine guns, then, to exert to the full their powers of effecting surprise and developing great intensity of fire, should reach effective and, if possible, close range without being observed.

"Machine guns ought, then, in battle to be carried forward by hand by the detachment, in order to take up positions as much under cover as possible; this does not in any degree lessen their opportunities of offensive action, for there can be no hope of decisive success for the infantry whom they are supporting except in a vigorous offensive."

GERMANY

GUN.—Germany has adopted the Maxim gun. The guns are mounted on sleighs which are themselves mounted on limbered gun-carriages, being clamped into grooves. They can either be fired from the carriage or be dismounted and fired from the sleigh. The gun on the sleigh can be adjusted to fire from a height of 1 ft. 6 in., 2 ft. 6 in. or 3 ft. 6 in. above the ground by a simple lattice-work arrangement. The gun can easily be dragged to almost any position where men can go, and can be fired by men lying down under cover.

ORGANISATION.—Machine guns have been organised into 16 batteries (called Sections), which are independent, and 216 companies, which are attached to infantry regiments.

The battery consists of six machine guns, drawn by four horses and divided into three sections (called Divisions). There are three ammunition wagons and one battery wagon (1st line). There are three 2nd-line wagons. The detachment consists of:

1 captain (in command); 3 lieutenants; 1 sergeant-

major; 12 N.C.O.'s; 36 gunners; 28 drivers; 1 armourer; 1 trumpeter; 1 apothecary (dresser); 70 horses (20 saddle and 50 draught).

The men wear a special greyish-green uniform, and are armed with carbine and bayonet; the carbines are carried in the limbers. 87,300 rounds are carried with each battery.

Each company consists of six guns drawn by two horses, three wagons, and one cart. The detachment consists of:

1 lieutenant (in command); 3 second lieutenants; 9 N.C.O.'s; 74 men; 28 horses (7 saddle, 18 draught, and 3 spare).

All the officers and 3 warrant officers are mounted. The men are armed with automatic pistols. 72,000 rounds are carried with each company, as follows:

With the guns	18,000
With the wagons	42,000
With the reserve cart	12,000
Total	72,000

On going into action each gun is made up to 5,000 rounds. The infantry pattern range-finder is used.

TACTICAL.—*Regulations for Machine-Gun Detachments in the German Army.*

Para. 187.—Machine guns enable commanders to develop at fixed points the maximum volume of infantry fire on the smallest possible front. Machine guns can be employed in any country which is practicable for infantry, and when once they are unlimbered they must be able to surmount

considerable obstacles. In action they offer no greater target than riflemen, fighting under like conditions, and they can in proportion to their fire value support far greater losses than infantry.

When movements over the battlefield are contemplated, and the machine guns (unlimbered as soon as hostile fire is expected) are pulled or carried forward, they can utilise all cover which infantry is able to use. Cover that is barely sufficient for a section of infantry can protect an entire machine-gun detachment. The construction of the carriage on which guns, ammunition, and men can be conveyed, and the capabilities of the team, enable machine guns to keep up with mounted troops on the march.

Para. 188.—The range and striking effect of the machine gun is identical with that of the infantry rifle. The rapid succession of shots and the narrow concentration of the cone of dispersion, together with the possibilities of uniting several guns on a limited front, render it feasible for machine guns to obtain rapidly a decisive success in certain positions, and even at long ranges to inflict heavy losses in a short time on large and deep targets. Machine guns, however, are of small use to a commander fighting a protracted rifle-fire engagement.

Para. 189.—An engagement with a thin line of skirmishers under good cover should be avoided. It demands a heavy expenditure of ammunition which is not commensurate with the result obtained. During a lengthy rifle-fire action the detachments with their guns should be withdrawn temporarily from their position, so as to save their effect for a decisive moment.

Para. 190.—The engagement of hostile machine guns that offer a difficult target is by no means the

chief duty of machine-gun detachments; in most cases it will be more profitable to leave this to other arms. When engaging hostile machine guns the most accurate information should be sought regarding the enemy's position.

Para. 191.—Machine-gun detachments can at all times and under all conditions confidently await the attacks of hostile cavalry. To meet these any formation can be adopted which allows of a well-directed and calmly delivered fire being poured into the advancing cavalry. Both when firing from the carriage and from the gun dismounted the fire must be distributed all along the advancing line of cavalry; special attention must be paid to the supporting lines, to one's own flanks, and to the defence of the carriages when the guns are separated from them. Machine-gun detachments are able to advance in the open fields without any fear of the enemy's cavalry, provided the latter is not supported by artillery or infantry, or is not in such force as to be able to attack simultaneously from different sides in several lines.

Para. 192.—In action against artillery it should be remembered that at long ranges the superiority of fire will always remain with this branch. If machine guns are to engage artillery, the sleighs must be brought as near as possible to it. The rapidity of movement of machine guns due to their being horsed will enable them to start the action from a flank, and thus produce a sensible increase of effect. Scattering the fire from all the machine guns along the entire line of a battery is as useless as it is purposeless.

Para. 193.—Machine-gun detachments should generally be employed undivided; on special occasions separate sections may be made to act independently. The detachment commander will

decide as to the distribution of the ammunition train to the individual sections. The employment of single machine-gun detachments will be seldom advisable. In such cases the senior detachment leader will command the entire force of machine guns.

Para. 194.—In view of the uses to which machine-gun detachments may be applied, and with the object of increasing their independence of action, it is desirable that a few mounted men should be attached to them for reconnaissance. Otherwise the readiness of machine guns is such that it is only in very obstructed and overgrown country that they require special protection. Here it may be necessary, in order to secure the threatened flanks and rear, and to protect the carriages left behind, to detail small parties of cavalry or infantry. An application for such from a machine-gun commander should be complied with by any infantry or cavalry commander in the vicinity.

Para. 196.—Machine guns can never replace artillery.

Para. 197.—Machine guns will always find their chief work to be at the place where their powerful fire effect, together with their mobility (on the march) and the advantage of being able to get across country when separated from their carriage, can best be utilised.

Para. 198.—For the correct manœuvring of machine guns it is necessary to possess a clear knowledge of the general situation, of the aims of the commander, and of the state of the action. The disposal of the machine-gun detachments rests with the superior command. By attaching machine-gun detachments to stated bodies of troops, the full value of the former in action can only be realised in

exceptional cases.

Para. 199.—All commanders must quickly make their dispositions to suit the situation, and must always realise that neglect and delay are a more serious hindrance to success than an error in the choice of means.

Para. 200.—At the commencement of an action the commander will proceed to the O.C. troops, or to the commander of the force to which his detachment is detailed, and receive the necessary orders for the impending action. It is his duty, in case of emergency, to act on his own initiative. During the progress of the action he will remain in constant communication with that commanding officer, in order to keep him constantly informed of what he is doing, and in turn to be posted in the progress of the fight.

Para. 201.—In choosing a position the first condition to fulfil is to obtain the best possible fire effect for the task in hand; then secondly one may think of cover.

Para. 202.—The choice of every position must be preceded by special reconnoitring, the opportune and skilful performance of which is essential to success. This includes ascertaining what the targets are, where there are suitable fire positions, and the facilities for approach, the nature of the ground to be crossed, and lastly what security is offered against surprises.

Para. 203.—In the advance and in defensive positions the commander reconnoitres himself. During retirements the commander remains with the detachment so long as it is within effective range of the enemy, but sends back for reconnoitring purposes

a senior officer. Before occupying a position the commander, if possible, must have examined it himself.

Para. 205.—The attention of the enemy must not be previously directed to the position selected. A personal inspection is often to be carried out only on foot, leaving all escort behind.

Para. 206.—The following points guide the choice of position: an open field of fire; a front lying as far as possible at right angles to the line of fire; plenty of space; possibility of sweeping all the ground right up to the closest range; concealment, and facilities for communication along and behind the line of fire.

Para. 207.—Positions close to or on a level with a point to which the enemy has ranged are to be avoided as much as possible. Similarly it is not advisable to take up a position in close proximity to prominent objects, still less straight in front of them, as they facilitate the enemy's ranging. On the other hand, a position in front of a dark background or in a place covered with vegetation hinders the enemy from picking up the target.

Every kind of concealment, even of an artificial nature, offers advantages, because the observation of the enemy is thereby impeded.

Para. 208.—During the advance and in moving into position security should not be overlooked. On threatened flanks special scouts must be sent out by the officer who is bringing up the troops, especially in close country. These should not ride far ahead, but should bear in mind to keep in touch with the troops. During the advance roads should be used as long as possible.

Para. 210.—The pace of the advance and the

moment of unlimbering depend on the object of the commander, the state of the action, the nature of the country and the state of the ground.

Para. 211.—The dispositions for taking up a position must be made in time to avoid any delay in opening fire. Every effort must be made to take up a position unobserved, and to open fire by surprise. Both of these are, however, only possible if special attention is paid to the utilisation of cover during the advance to the position, thus keeping the enemy in ignorance of the locality which it is intended to occupy. In the absence of cover, or when immediate entry into action is required, the surprise of the enemy must be effected by rapidity in occupying a position.

Para. 213.—The most favourable position must be sought for each individual weapon with regard to fire effect and cover. As a rule there is an interval of 20 paces between guns, but the direction and regularity of the intervals in the detachment are not to be insisted upon. It must be considered, however, that the losses caused by the enemy's fire will be heavier in proportion as the machine guns are posted closer together. Care must be taken that the individual guns do not interfere with one another's fire. Placing single guns in echelon may offer advantages where the flanks are threatened.

When the nature of the ground or of the target renders a more careful choice necessary for each gun, it is recommended that this be carried out by the No. 1 of the gun.

Para. 214.—The decision to open fire must not be made too hastily. It is to be borne in mind that the fire can only have a decisive effect when it is

directed against troops situated within effective range. The arm to which they belong has little to do with the question; the decisive point in choice of target is first and foremost the momentary tactical importance of that target. Afterwards fire must be turned on to those targets which, owing to their height, depth, breadth, and density, render a high percentage of hits probable.

Para. 215.—Good results from indirect fire can only be achieved if the range and position of the target are known, or if the fall or the effect of the shots can be observed from a point close to the detachment.

Para. 216.—Firing over one's own troops is only permissible when the nature of the ground renders possible the deployment of several firing lines one above the other.

Para. 217.—Firing by night can only promise success if the guns can be trained by daylight on to points where the enemy is expected, or if well-lit objects are taken as targets, such as bivouacs or camps.

Para. 218.—From the very beginning of an action it must be remembered that the number of cartridges carried is limited, and that the consumption of ammunition implies an expenditure of power which should only be made when it will meet with success. Should the decision be taken, however, to fire on a given target, the ammunition necessary to attain the object of the action must be expended. Fire with an insufficient effect weakens the morale of the troops, whilst it encourages the enemy.

Para. 219.—The losses inflicted on the enemy will affect him more if he incurs them in a short space of

time, than if they are distributed over a long period; it is advisable therefore in most cases, even in the face of a weaker enemy, to open fire with the whole detachment rather than with one or two sections only.

The expenditure of ammunition necessary for the silencing of the enemy will in both cases be about the same, but in the former case one's own loss will be appreciably smaller.

Para. 220.—A change of objective should not be made until the result aimed at against the first target has been fully realised. A frequent change of objective weakens the fire, and should therefore be avoided.

Para. 221.—A distribution of fire over several objectives cannot be avoided under all circumstances, but it must not resolve itself into an aimless scattering of fire.

Para. 222.—In every case coolness, marksmanship, and strict fire discipline are necessary to get full value in fire effect. In an engagement, should the majority of those in command be put out of action, fire discipline must still be preserved. With well-trained and well-disciplined troops, the presence of mind of the individual soldier, and the example of stout-hearted and cool-headed men will ensure a successful conclusion to an engagement fought against an enemy in a similar plight.

Para. 223.—The officer commanding the troops announces the object of the action, and also the objective in a general way.

Para. 224.—The machine-gun detachment commander selects the positions, determines the range, names the targets in detail together with the

nature of attack on them, and orders the opening of fire.

Para. 225.—The section commander passes on the orders. He decides the place for each gun, also the portion of the objective to be fired at, and the range for each individual weapon. He observes the service of the guns, and is especially responsible that the correct target is fired at and for the fire action of his section.

Para. 226.—The No. 1 of the gun selects the spot to place his gun, and the most suitable height for it to stand above ground, follows in detail all orders, and ensures (using in case of necessity independent measures) that the centre of the cone of dispersion falls on the target. He is responsible for the service of the gun in detail, and attentively watches the weapon so as to remedy any defects which might interfere with its fire effect.

Para. 227.—By a correct utilisation of the degree of independence allotted to each individual commander, by a rapid and accurate ascertaining of ranges, by a correct judgment of the influence of the weather on the cone of dispersion, it is possible to avoid an interruption of the fire of the whole detachment for an alteration of the sights. Any such interruption must be especially avoided when it is obvious from the nature of the objective that it will only be in view a short time. Again, when firing at such objectives, no time must be lost by giving a long and detailed description of the target.

A well-trained detachment should be able to get quickly on to the target, and to distribute its fire advantageously on receiving brief words of command. If one part of the enemy is silenced or has vanished, the fire must at once be independently

directed on the still visible and active part of the objective.

Para. 228.—The position of the commander is of importance for issuing commands and controlling the fire. In peace exercises all commanders must issue their orders from the same positions and in the same attitude they would adopt in actual warfare. The commander may allow himself to depart from this rule, and order the subordinate commanders to do the same, in so far as such a step is necessary for instructional purposes. Moreover, it must be strongly insisted upon that no man should expose himself more than is absolutely necessary for the observation of the general situation, the service of the guns, the conveyance of ammunition, and the taking of ranges.

Para. 242.—In an action of two forces meeting, the advanced guard must secure time and space for the main body to deploy. As the accomplishment of this duty depends essentially on the rapid occupation of favourable points on the ground, the allotment of machine guns to the advanced guard will be highly advantageous. On the arrival of the infantry the machine guns must be withdrawn from the firing line, and kept in readiness for further employment.

Para. 243.—In an attack on a fully developed and defended front, the machine guns will as a rule be kept back. They constitute a highly mobile reserve at the disposal of the G.O.C., which may be used for the speedy reinforcement of threatened points, for acting against the flanks of an enemy, and for the preparation of an attempt to break his line. The attack in view has a chance of success only when superiority of fire is established. For this purpose

machine guns possess ample mobility to enable them to follow infantry advancing to the attack. That they should join in the rushes of the firing line is no more required of them than that they should join in the charge.

Under skilful and judicious leadership they will nevertheless be able to come so close to the enemy as to take part in the decisive fire engagement; the temporary increase of distance from the carriages need not be considered.

It is of exceptional advantage to direct the fire against the point of the enemy's line selected for the attack from a commanding position, or from a flank, since under these circumstances it is not necessary to cease fire when the infantry continue their advance, and prepare for the final rush. Should such a position be reached at a range which admits of the maximum fire effect (800 yards or under) any further forward movement of the machine guns is wrong; it interrupts the fire effect and entails fresh laying and ranging.

Para. 244.—In the event of a successful issue of the action, the machine guns must co-operate with the first pursuit by a lavish use of their fire power. As soon as the victory is assured they will be hurried forward into the captured position to support the infantry in their occupation of the same, and to crush the last powers of resistance of the enemy.

Para. 245.—Should the attack fail, the machine guns must support the retiring troops.

Para. 246.—In using machine guns in defence, one must consider that the guns are not suitable for conducting a protracted action for any space of time, and that the advantage of the machine guns' mobility

cannot be utilised if a fixed part of the position is handed over to them for defence at the outset. It is to be recommended generally, and particularly in the defence, to keep the guns at first with the reserve, and to utilise them as the need arises—to strengthen the defending line at threatened points, to hinder outflanking, and to repel an attempt at storming the position, or for offensive movements. This does not always exclude machine guns from entering into action at the commencement of an engagement, *e.g.* if it is necessary to command certain important approaches. Also, if a covered retreat for the machine guns is assured, it will be possible to place them to the front or to the side of the main line of defence, so that they can sweep with their fire the country which the enemy will presumably occupy with his artillery.

At times a flanking machine-gun fire can be used to sweep dead ground in front of the line of battle.

Para. 247.—In all cases where machine guns are placed in positions selected beforehand, cover must be constructed. If the time is not sufficient for this, an attempt must at least be made to arrange some artificial concealment, to improve the field of fire, and to determine ranges.

Para. 248.—After a successful action machine-gun detachments must be utilised in the boldest fashion, to turn the victory to account during the pursuit. They are highly suitable for this purpose, as they unite great power of fire with rapidity of movement. The pursuit must be continued as long as strength permits. The machine guns will approach to within effective range of the enemy, and hinder every attempt of the adversary to re-form and take up a position. Flanking fire is especially effective. A

liberal supply of ammunition must be pushed forward, this being necessary for the energetic maintenance of fire in pursuit.

Para. 249.—When breaking off an action in the event of an unsuccessful issue, the machine-gun detachment can render considerable service by opposing the enemy, regardless of the possible loss of the guns, and by pouring a vigorous fire into him. For keeping the enemy in check, positions behind defiles with covered lines of retreat are especially suitable.

Special importance must be attached to the provision of sufficient ammunition, to the thorough reconnaissance of the lines of retreat, and to the correct estimation of the moment for beginning to retire, especially when the movement is to be carried out in echelon. To avoid obstruction the ammunition wagons must be moved away at the right moment. Increased attention must be paid to the flanks, since it is from these that danger most threatens during a retreat. If suitable positions can be occupied on the flanks, increased facilities for conducting the retreat will be obtained by utilising them.

Para. 250.—Machine guns attached to independent cavalry might be used to increase the power of cavalry, mounted and dismounted, and on the offensive and defensive. The duties that will fall on machine guns in this service demand great mobility and the strictest fire discipline.

Para. 251.—The commander of the independent cavalry will make all decisions regarding the employment of machine guns. He communicates all his plans of action to the machine gun commander, and provides him further with special orders concerning the first entry into action of the machine

guns. If the machine guns are not to be used, it is advisable to leave them behind in a suitable covering position.

Para. 252.—On reconnaissance duty with the cavalry, machine guns will be most frequently employed in breaking down the resistance of the enemy at small posts or defiles which they have occupied, or vice versa—to stiffen the opposition made by the cavalry at such points. On such an occasion even the assistance of a single section with its ammunition will be of use to the cavalry detachment.

Para. 253.—In the advance of cavalry against cavalry the machine-gun detachments must take up their positions as soon as possible, so as to support first the deployment, and then the attack of the cavalry. The most advantageous position will be well to the front and to a flank of the advancing cavalry, since from there a continuation of the fire is rendered possible up to the moment almost of the charge, and at the same time an outflanking movement of the enemy is prevented on that side. A position secure against direct attack is to be desired, yet a consideration of the effect gained by the position described above precedes all thought of cover. A change of position is almost always out of the question, owing to the rapid development of a mounted action.

Para. 254.—A wide separation of the sections is not advisable, since several lines of fire hamper the movements of cavalry.

Para. 255.—In a forward movement of the machine guns when limbered up, decreasing the intervals to less than 10 paces must be avoided, since smaller spaces render difficult the passage of the

limbers to the rear.

Para. 256.—During the fight the detachment commander will have to act on his own responsibility, according to the state of the action. He must not wait for orders, and must always watch the cavalry engagement; he must use every opportunity to join in the issue at stake and make preparation for decisive action in case of either a successful or an unsuccessful termination of the struggle. Under certain conditions it may be advantageous to await events with his guns ready to march.

Para. 257.—In the event of a favourable issue of the action, it will be his duty to follow the beaten enemy with his fire and to prevent him from offering further resistance.

Para. 258.—The nature of a cavalry engagement will often render it necessary to keep the carriages close to the guns or to shoot from the wheeled carriages. Since the massing of several carriages in rear of the detachment offers the enemy a favourable opportunity for attack and impedes firing towards the rear, the question will arise whether the ammunition wagons should be kept back in a secure place.

Para. 260.—The machine-gun detachments attached to the cavalry divisions remain with them in action. They will find occasion to prove of service in the varied duties of cavalry during and especially after action.

Para. 261.—Also for protecting batteries in position, machine guns can be profitably employed, if infantry are not forthcoming for this duty.

Extract from "Field Service Regulations, 1908"

"The fire effect of machine guns is influenced primarily by correct sighting, possibility of observation, size and density of target, and methods of fire."

"It is further affected by the suddenness with which fire is opened, by the number of machine guns firing at the same target, and by the enemy's fire. The high rate of fire concentration of the bullet-sheaf, and the possibility of bringing several machine guns into action on a narrow front, enable great effect to be produced in a short time even at long ranges. When the front of the target is broken and irregular, the effect is reduced. A wrong sighting elevation or an imperfect observation of fire may render the fire completely ineffective."

"Dense lines of skirmishers standing suffer heavy losses at ranges of 1,650 yards and under. At lines of skirmishers lying, good effect is to be expected at 1,100 yards and under, provided that the observation of fire is good. Against artillery in action the fire is similar to that of infantry. Owing to the mobility of machine-gun batteries they are especially adapted for securing the increased fire effect due to *oblique* fire."

"At short ranges under hostile fire machine guns can only be brought up and withdrawn under cover."

The German *Cavalry Drill Book* of 1909 has some interesting paragraphs on the employment of machine guns, which are here given:

Para. 497.—Horse artillery and machine guns, by reason of their fire, enhance the offensive and defensive powers of cavalry. In defence and against

unexpected opening of fire they form the most effective portion of the force.

Para. 498.—Horse-artillery fire will often be the first thing to make the enemy disclose his dispositions, and thus is useful for reconnaissance. In conjunction with machine guns it can break down the enemy's resistance in defiles, and thus save the cavalry the necessity of dismounted action.

Para. 498.—Artillery and machine guns enable the cavalry, ... especially by fire effect upon their flanks, to distract hostile columns from their line of march.

Para. 500.—Detached forces of the Division may be allotted artillery and machine guns to increase their powers of offensive action.... The employment of single machine guns is forbidden.

Para. 501.—The commanders of artillery and machine guns must be kept informed of the situation and of the cavalry commander's intentions. They remain with him until the employment of their commands has been arranged for; and, if necessary, it is their duty to bring this question of employment to his notice. At later stages they must keep in constant communication with him. Guns and machine guns come into action for the first time by order of the leader.

Para. 502.—As a general principle, fire is to be opened on those portions of the enemy the defeat of which is likely to influence the decision of the fight. Under anything like equal conditions, a duel with the hostile artillery cannot lead to rapid results. But should the hostile artillery expose itself, the opportunity must be seized with rapidity and energy. It may be also necessary to engage hostile artillery in order to draw their fire from the cavalry.

Para. 503.—Fire control is facilitated by keeping the batteries together, nor is any great dispersion of the machine-gun sections, as a rule, to be recommended. Many lines of fire cramp the movements of cavalry during the mounted combat. The conditions of the fight, however, or the configuration of the ground, may necessitate dispersions and separate positions.... Machine guns only require an escort when the field of view is very restricted.

Para. 507.—In the *mounted cavalry combat* guns and machine guns must be brought into action so as to support, firstly, the deployment; secondly, the attack. Positions for the machine guns, to a flank and in front of the advancing cavalry, all on rising ground, will allow fire to be maintained until immediately before the collision, and will make it difficult for the enemy to envelop a flank. On the other hand, the disadvantage is that any large flank movement takes time, and sometimes so much time that the decisive moment may pass while it is being carried out, and the guns may arrive too late.... It is desirable that artillery positions should be secured from direct attack by the nature of the ground. But if circumstances demand it, artillery and machine guns must come into action on the spot, without regard for cover or other advantages.

Para. 509.—Unless fresh bodies of cavalry offer a tempting target, fire will be turned on to the hostile batteries and machine guns immediately after the collision of the cavalry masses.

Para. 510.—During the fight the leaders of artillery and machine guns will for the most part have to act on their own initiative. They must seek every opportunity for intervention, and, according to the

course of the fight, must make preparations for action under favourable or unfavourable conditions. On occasions it may be necessary to remain limbered up and ready to move.

Para. 511.—After a successful attack artillery and machine guns advance rapidly to follow up the beaten enemy with fire, and to prevent his rallying for renewed opposition. If the result be unfavourable, artillery and machine-gun leaders must come to a timely decision whether the circumstances call for a retirement to a covering position, or whether they should not hold on to their fire position even at the risk of losing the guns.

Para. 512.—Owing to the character of the cavalry encounter, it is often advisable to keep the limbers with the guns. And it may sometimes be well to leave a portion of the second-line wagons and the carts of the machine-gun detachments behind in a place of security, and to order the light-ammunition column to march at the head of the second-line transport. Yet another question may arise for the machine-gun detachments; whether to take the wheeled carriage or only the sleigh mountings into the firing line.

Para. 513.—If the assault succeeds, guns and machine guns hurry to the captured position to take part in the pursuit.

Should their own attack fail, or should that of the enemy succeed, artillery and machine guns must endeavour to cover the retirement, and, disregarding the hostile artillery, must turn their fire into pursuing riflemen.

In a recent article in the *Jahrbücher für die Deutschen Armeen und Marine* Captain von Beckmann gives the following summary of the tactical use of machine guns:—

1. Machine guns must take up the smallest possible space, and be capable of quickly coming into action (at rifle ranges). They must be capable of accompanying infantry and cavalry wherever these arms can go.

2. They can never take the place of artillery, though capable, especially at short ranges, of affording effective support to the latter.

3. The fire of one machine gun is approximately equivalent to that of 80 infantrymen. The dispersion of fire is considerably less; therefore while the effect is greater with an accurate sight, it is less if the range is not accurately known.

4. The most suitable targets are those of some size and depth—*e.g.* infantry columns, cavalry in all formations, and artillery when limbered up. At medium ranges, extended firing lines may be fired upon, but little effect can be produced upon men lying down, even at the shortest ranges—though the morale effect may be considerable.

5. Short bursts of heavy fire are especially effective. On the other hand, long-continued fire is unsuitable, owing to the expenditure of ammunition and the heating of the barrel.

6. Artillery in position provided with shields can only be effectively damaged by enfilade or oblique fire.

7. Machine guns may either be employed directly under the orders of the G.O.C. or be attached to

certain units. In the first case they will usually act in complete machine-gun units. In the second case they will generally do so only at suitable targets at long and medium ranges. In the later stages they will mostly be used in sections. The use of single machine guns is to be avoided.

8. The intervals between machine guns in action must depend on circumstances. They should not be too small if the guns are to hold their ground for any length of time. When a section (2 guns) is acting alone, the guns must be able to afford effective mutual support in all directions.

9. Ammunition must be carefully husbanded, especially at the longer ranges, while a good supply of ammunition is essential. Even at long ranges, this ammunition will have to be carried by men specially equipped for the purpose.

10. When the enemy is unexpectedly met with while on the march, machine guns will be of special value to the advance guard in rapidly seizing points in order to hold the enemy at a distance. The occupation of such points at wide intervals will often effectively deceive the enemy as to the strength of the force. Machine guns thus employed will be withdrawn as soon as the infantry come up and deploy, so as to be available for other work.

11. The wide extensions of modern armies will often make it impossible for any but mounted troops to be concentrated at decisive points—either to make the most of favourable opportunities, or to ward off an unexpected danger. Mounted machine-gun detachments will be very valuable for such purposes.

12. In the attack of a defensive position deliberately occupied, part of the machine guns will

at first be held in reserve, but, according to the latest opinions formed from the lessons of the Russo-Japanese War, the majority of the machine guns will support the advance of the infantry. They are especially effective in keeping down the defenders' fire during the last stage of the attack when the artillery is no longer able to fire over the heads of the infantry.

13. On the defensive it is advisable that a considerable number of machine guns should be held in reserve, especially with a view to preventing any unexpected turning movements, repelling assaults, delivering counter-attacks, and in case of such reinforcing any threatened points in the line of defence. In fortified positions machine guns may be usefully employed in front of the position to force the enemy to deploy prematurely. His artillery as it comes into action will frequently offer very suitable targets. The majority of machine guns, however, will be placed in the line of defence (or at least immediately in rear of the sections to which they are allotted) as soon as the direction of the enemy's attack has been ascertained. This presence in the front line will make it possible to reduce the number of men actually in that line and will thus economise troops.

14. In the pursuit machine guns will be especially effective against the flanks and rear of the retiring enemy. Again, in covering a retirement and checking the enemy's pursuit, machine guns with cavalry and artillery will delay the enemy's advance and enable their own infantry to break away. In this case the first duty will be to protect their own artillery.

15. With the Independent Cavalry machine guns form a very valuable addition to the effective

strength both for defence and offence. Even in reconnaissance work they will be able to break down the enemy's resistance at certain points (villages) and to increase the tenacity of their own forces in the defence of similar points. Light machine guns carried on the saddle would be of the greatest assistance to smaller bodies of cavalry in such circumstances. Machine guns are also valuable in purely cavalry engagements, especially when it is possible for them to take the enemy in flank. If this be impossible, they can effectively follow up a success, or cover the retirement of their own cavalry. If some of the machine guns act as escort to the artillery, the cavalry escort can be dispensed with. This will increase the effective strength of the cavalry and also give the artillery a wide choice of position and great security, thus increasing its efficiency. Even if at the beginning the cavalry commander himself directs the working of the machine guns, the officer commanding the latter will have to act on his own initiative later on, in accordance with the tactical situation of the moment.

GREAT BRITAIN

ORGANISATION.—Great Britain was one of the earliest countries to adopt machine guns, and the Maxim has been in use for the last twenty years. Machine guns are organised in sections of two guns, and a section forms part of each regiment of cavalry and battalion of infantry, who provide and train the personnel.

The organisation is as follows:—

A SECTION WITH A CAVALRY REGIMENT



Personnel.		Riding horses.	Draught horses.
Lieutenant	1	3	—
Sergeant	1	1	—
Corporal	1	1	—
Privates	12	12	—
Drivers	8	—	16
Bâtman	2	—	—
	25 (1 officer)	17	16

Equipment.—6 pack-saddles (the two lead horses of each wagon are provided with pack saddlery); 4 G.S. limbered wagons (2 for guns and 2 for ammunition); 2 machine guns with tripods and pack-saddles on limbered G.S. wagons, each drawn by 4 horses.

Ammunition.—3,500 rounds with each gun; 16,000 with regimental reserve; 10,000 with brigade ammunition column; 10,000 with divisional ammunition column for each gun respectively.

SECTION WITH AN INFANTRY BATTALION

Personnel.		Riding horses.	Draught horses.
Subaltern	1	1	—
Sergeant	1	—	—
Corporal	1	—	—
Privates	12	—	—
Drivers (1st-line transport)	2	—	4
Total	17 (1 officer)	1	4



MACHINE GUN ON ADJUSTABLE TRIPOD BEHIND COVER.
FRONT VIEW.
By Permission of Messrs. Vickers, Sons & Maxim, Ltd.



MACHINE GUN ON ADJUSTABLE TRIPOD BEHIND COVER.
VIEW FROM REAR.
By Permission of Messrs. Vickers, Sons & Maxim, Ltd.

Equipment.—2 machine guns with tripods on 1 limbered G.S. wagon drawn by 2 horses.

Ammunition.—3,500 rounds with each gun; 8,000 with regimental reserve; 10,000 with brigade ammunition column; 10,000 with divisional ammunition column for each gun respectively.

TERRITORIAL FORCE: SECTION WITH AN INFANTRY BATTALION

Personnel.		Riding horses.	Draught horses.
Subaltern	1	1	—
Sergeant	1	—	—
Rank and File	15	—	2
Total	17 (1 officer)	1	2

Equipment.—2 machine guns on field carriages each drawn by 1 horse.

Ammunition.—4,000 with the guns; 6,000 with regimental reserve; 10,000 with brigade ammunition column.

SECTION WITH A YEOMANRY REGIMENT

Personnel.		Riding horses.	Draught horses.
Subaltern	1	2	—
Sergeant	1	1	—
Corporal	1	1	—
Privates	12	12	—
Drivers	4	—	8
Bâtman	2	—	—
Total	21	16	8

Equipment.—2 carts for guns, tripods, and 2 sets of pack-saddlery; and 2 carts for machine-gun ammunition.

Ammunition.—3,500 rounds with each gun; 6,000

with regimental reserve; 10,000 with brigade ammunition column.

MOUNTING.—There are five English patterns of tripods in use and one Indian. Marks I. and II. English pattern and the Indian pattern are exceedingly clumsy, and have been largely replaced by Marks III., III.A, and IV. Mark III. weighs 49 lb., and consists of a crosshead and pivot mounted on three legs with a saddle for firer, and has elevating and traversing gears. A traverse of 25 degrees can be obtained. The two front legs of the tripod are pivoted in sockets and secured by wing nuts, and can be splayed to lower the gun, and fold up for transport. The legs are fitted with shoes to steady the mounting by gripping the ground. When firing, the ammunition box is placed on the ground on the right side of the gun.

On the pack-saddle the gun and tripod are carried on either side of the saddle on hooks and secured by straps. The tool box is carried on the top of the saddle. With this mounting 4,000 rounds of ammunition are carried in eight boxes, four on each side of the ammunition pack-saddle on a second animal.

Mark III.A tripod weighs 56 lb., and differs from Mark III. as follows:

1. The pivot has a bearing surface to support the rear end of crosshead arm.

2. The hand nut of elevating gear is formed with four small radial holes.

3. The rear leg is telescopic, and consists of an inner and outer tube. The inner tube has a shoe, and the rear end of the outer tube has a bracket for the saddle and a handle to clamp the inner to the outer

tube.

The Mark IV. tripod weighs 48 lb., and the mounting consists of a crosshead, elevating gear, and socket mounted on three legs. It has 13 degrees elevation and 25 degrees depression, but by arranging the position of legs 43 degrees and 55 degrees can be had. It has an all-round traverse. The elevating gear is actuated by a hand-wheel, which consists of an inner and an outer screw. The legs are of tubular steel, the lower ends being fitted with shoes to steady the mountings, and the upper ends have a joint with serrations; the rear leg has a joint pin with nut and jamming handle. Joint studs with disc springs and jamming handles are fixed to the front legs, by which the legs are securely clamped in the required position. Numbers are stamped on the legs to show the relative position of the legs to their normal position. The legs are secured by a leather strap for transport. When firing, the ammunition box is placed on the ground on the right side of the gun. The gun can be fired at heights varying from 14½ inches to 30 inches above the ground.

TACTICAL.—Directions for the use of machine guns are found in the various textbooks issued for each arm. Training is dealt with in the *Handbook for ·303 Machine Guns*, 1907, and in the *Training Manuals Appendix*, 1905. The following directions for their employment in the field are from the latter, ch. vi. pp. 157-63:

Para. 2.—Surprise is a powerful factor in the effective employment of the machine gun; every effort must therefore be made to avoid the enemy's observations both when advancing to a position and when in action. The machine gun possesses the power of delivering, from a very narrow front, a

practically uninterrupted volume of closely concentrated rifle fire, which can be directed against any desired object with the least possible delay. The delivery of such fire cannot, however, be long sustained, because of the heavy expenditure of ammunition involved and the difficulty of replacing it.

It is necessary, therefore, for its effective use, that its movements and fire action should be so regulated as to enable it to open fire rapidly whenever a favourable target presents itself, for the losses inflicted on an enemy will affect him in proportion to the suddenness and rapidity with which they are experienced. As the rôle of machine guns is to assist the particular body of troops to which they belong, the machine-gun commander should be fully acquainted with the orders issued to such troops. He should also carefully watch and conform to their movements, and assist them by every means in his power. As a rule the guns belonging to a unit will be employed singly in order to obviate the concentration of hostile fire against them, the most favourable position being sought for each weapon with regard to fire effect and cover; this, however, should not prevent the guns being used together when the circumstances of the moment demand the adoption of such a course. The massing of guns should be rarely resorted to. When it is desired to bring an overwhelming fire to bear on any locality, it should be accomplished by the concentration of fire from dispersed guns. The selection of a fire position should be preceded by careful reconnaissance on the part of the machine-gun commander. The following points should be looked for:

(*a*) A good field of fire.

(*b*) Concealment.

(*c*) Cover from the hostile fire.

(*d*) Possibilities for advancing to the position unobserved, and facilities for ammunition supply.

(*e*) Security against a covered hostile approach.

If a position affording concealment is not available, one should be selected which from the nature of its background will be difficult for the enemy to locate. As the opportunities for the effective action of machine guns will often be very brief, and as the guns will usually be employed singly, the non-commissioned officer in charge of each gun will, as a rule, have to act on his own initiative in choosing the objective, judging the range, and in deciding when to open fire. As a general rule, machine guns are best adapted for action at effective ranges; at these it is usually possible to distinguish the target, to ascertain its range, and to observe the effects of the fire. When, however, concealment and protection from fire exist, it may sometimes be advisable to bring machine guns into action at decisive range. If a sufficiently large target be offered and the range be known, the concentration and rapidity of their fire will enable guns to be employed, with considerable effect, at long ranges. Machine guns should seldom engage artillery at long rifle range, for in such circumstances superiority of fire will always rest with the latter if the machines are located. Within effective range, however, machine guns, if concealed, should inflict considerable loss on hostile artillery. Engagements with their lines of skirmishers should be avoided, for the risk of disclosing the position of the guns and the heavy expenditure of ammunition involved will rarely be justified by results. Since the gun is not

well adapted for keeping up protracted fire, it may be often expedient to withdraw it from action, move it elsewhere, or hold it in reserve for a more favourable opportunity.

The selection of a target upon which to fire should be governed by (*a*) its tactical importance; (*b*) its dimensions and vulnerability. It is essential that due regard to economy of ammunition should be observed. When, however, it is decided to open fire, the ammunition necessary to secure the results sought must be expended without hesitation. "Deliberate fire" will rarely be resorted to. In cases where a favourable target is offered, prolonged "rapid fire" may be employed, but the most suitable description of fire will usually be "rapid" in series of from 25 to 30 rounds.

The range should be taken by a range-finder or ascertained from neighbouring infantry or artillery. Ranging by observation of fire should be employed only when the nature of the soil is very favourable and when no other method is practicable. When a reserve ammunition cart is provided for the machine guns it will be under the orders of the machine-gun commander, who will arrange that it is placed where it can most conveniently supply the guns with ammunition; it should be screened from view, and if possible sheltered from fire. All belts shall be refilled as soon as possible after they are emptied. Should the machine-gun commander consider an escort necessary, he will at once bring the fact to the notice of his commanding officer.

With Infantry in the Attack

Para. 3.—The machine guns will cover the advance of the firing line by engaging the enemy from

positions in close support of it. In ordinary open ground it would rarely be advisable to push them into the firing line, where they would offer a conspicuous target to the enemy; but in a broken or enclosed country, where the guns can be brought up under cover, occasions may arise when they can be usefully employed in a forward position. When the ground is favourable the gun may with advantage accompany that portion of reserves told off to cover the advance of the remainder by long-range fire. Machine guns will co-operate with the attacking infantry in the decisive fire action in endeavouring to obtain a superiority of fire. Positions on the flank of the attacking battalions or on commanding ground, if available, should be selected, as they admit of the guns remaining in action whilst the firing line is pushing forward. A position on the flank of the attacking infantry has the further advantages that oblique or flanking fire, which from machine guns is particularly effective, can be brought to bear against the enemy, whilst guns so placed are less likely to draw fire upon the attacking infantry. A change of position during the decisive fire action interrupts the fire and entails fresh laying and ranging, and therefore should be seldom resorted to unless an increased fire effect is to be obtained. At the decisive stage of the attack, fire of the greatest intensity should be continued as long as is compatible with the safety of the advancing firing line. In the event of the attack succeeding, the guns should be pushed forward at once in order to pursue the retreating enemy with their fire. In the event of failure, every effort should be made to cover the retirement of the firing line. They will assist in repelling counter-attacks to which the firing line may suddenly become exposed, and in the protection of the flanks against

cavalry or counterstroke. They may be employed to give effect to holding attacks or feints, by rapid fire directed against successive portions of the enemy's line; also to make good positions secured in the course of an action.

In the Defence

Para. 4.—It is more important to shield machine guns from artillery fire than to obtain a long range for them. Their position, therefore, should be always concealed, and cover from fire should be provided. They are best utilised to sweep with their fire spaces which are particularly exposed, but which the enemy is compelled to cross; to flank salients, cover obstacles, deny the passage of roads and defiles, or to guard the flanks of the position. It will be at times expedient to retain the guns in reserve until the enemy reaches effective ranges. In such cases, emplacements should be prepared previously and covered approaches provided. Machine guns may also be held as a reserve of fire to check the advance of hostile reinforcements, to meet turning movements, or to prepare and cover the counter-attack. When their retirement is not likely to be compromised, machine guns may be utilised in positions in front of the main line to delay the enemy's advance.

In Pursuit and Retreat

Para. 5.—In pursuit machine-gun commanders should act with great boldness, and it should be their endeavour to come into action against the enemy's flanks at decisive range. In retirements they should avoid close engagements, and should take up successive fire positions, from which to delay the enemy's advance and protect the flanks of the rear

guard.

With Advanced and Rear Guards and with Outposts

Para. 6.—With an advanced guard machine guns may often be pushed forward to assist in dispersing small bodies of the enemy who might delay the advance; they may also be employed in opposing the enemy's advance and in preventing the occupation of important positions until the arrival of the main body. With the outposts they may be used to sweep the approaches, and to dominate certain points which an enemy, in advancing, is likely to pass or to occupy.

With Cavalry

Para. 7.—As a general principle machine guns should be employed to supplement the fire action of cavalry. During the cavalry combat they may be suitably employed in protecting the flanks or in directing an oblique fire against the hostile cavalry. When the charge is successful they should press forward and engage the hostile cavalry at close range. In event of defeat they should form rallying points and endeavour to check the enemy's pursuit. In reconnaissance, or other detached duties, the machine guns should be retained by the commander of the unit as a reserve, ready to move to any point where their presence may be required. They may be utilised for such purposes as to induce the enemy to expose his position; to drive in hostile patrols; to check the pursuit of victorious cavalry; to delay the enemy's infantry, etc. When their fire has achieved its object they should be withdrawn temporarily. In other circumstances their action should be guided by the principles set forth in the case of infantry.

From "FIELD SERVICE REGULATIONS," *Part I., Operations*, 1909

The machine gun possesses the power of delivering a volume of concentrated rifle fire which can be rapidly directed against any desired object. Rapid fire cannot be long sustained, owing to the expenditure of ammunition involved, and it is therefore necessary that the movements and fire action of the weapons should be regulated so as to enable them to open fire immediately a favourable opportunity arises. Surprise is an important factor in the employment of machine guns, which should be concealed, and whenever possible provided with cover from fire. The massing of machine guns is likely to attract hostile artillery fire. For this reason it is usually better to employ them in pairs in support of the particular body of troops to which they belong. When an overwhelming fire on a particular point is required it can be provided by concentrating the fire of dispersed pairs of guns. The guns of two or more units may, if required, be placed under the command of a specially selected officer and employed as a special reserve of fire in the hands of a brigade commander. Machine guns are best adapted for use at effective infantry ranges, but when good cover from view and fire exists they may be usefully employed at close infantry ranges.[62]

With Outposts

Machine guns with outposts may be employed to sweep approaches, and to cover ground which an enemy in advancing may be compelled to pass or occupy.[63]

During the Battle

Machine guns will be especially valuable in bringing a sudden fire to bear from such positions, both in order to cover a further advance and to assist in defeating counter-attacks. Machine guns can normally support an attack most efficiently from well-concealed positions provided with good cover, and within effective infantry range of the enemy. Occasionally, when good opportunities for a concealed advance present themselves, they may be established within close infantry range of the objective.[64]

From "CAVALRY TRAINING," 1907

Machine guns afford a means of developing fire without dismounting men from the squadrons. During the cavalry fight they will usually be massed under one commander, but may be employed in pairs when necessary. They will co-operate with the horse artillery, the great volume of fire which they are able to bring to bear from a narrow front being particularly effective. Their presence with the artillery will often admit of the latter dispensing with any other escort.[65]

Position of Machine Guns

During the approach march the machine guns will usually accompany the artillery, to whom they may act as escort when necessary.[66]

From "INFANTRY TRAINING, 1908" (AMENDMENT, AUGUST, 1909)

General Characteristics

1. The machine gun possesses the power of delivering rapidly from a narrow front a volume of

closely concentrated fire which can be controlled easily, be turned readily in any desired direction, or be distributed by traversing.

2. The effective range of machine guns is the same as that of the rifle; they are therefore not suited for employment in place of artillery. On the other hand, the effect of machine-gun fire at effective infantry and close infantry ranges is very great, and at close infantry ranges it may, with favourable conditions, be annihilating. Machine guns are very suitable for the development of covering fire within the limits of effective rifle range. They can accompany the troops to which they may be attached over any country.

3. The action of the mechanism is liable to temporary interruption by jams. Machine guns should not therefore be used singly under normal conditions. They are organised in sections of two guns, which should rarely be broken up.

4. Machine guns are essentially weapons of opportunity. The expenditure of ammunition involved and the nature of the mechanism make long periods of rapid fire unsuitable. The power of the gun is best used to develop unexpected bursts of fire.

The Organisation and Training of Infantry Machine-Gun Sections

1. The strength and composition of a machine-gun section are shown in War Establishments. An infantry machine-gun section is an integral portion of an infantry battalion, but two or more sections may be brought together by the brigade commander and used under the command of a brigade machine-gun officer.

The two non-commissioned officers and twelve

privates shown in the establishment will be trained as first-class machine gunners. Two non-commissioned officers and twelve men will be trained, as opportunity offers, as second-class machine gunners to replace casualties among first-class machine gunners.

2. A subaltern officer, other than the assistant adjutant, will be selected in each battalion to command and train the machine-gun section, under the orders of the commanding officer. Should a brigade commander desire to train the machine guns of his brigade to act together when massed, an officer, who is not the machine-gun officer of one of the battalions of the brigade, may be selected to supervise the firing practice and to conduct the brigade training of machine-gun sections.

3. Officers, non-commissioned officers, and men detailed for machine-gun training should be changed as little as possible; the two non-commissioned officers and twelve men trained as first-class machine gunners will fire the practices prescribed in the Musketry Regulations with one of the companies of the battalion,[67] but will at other times be at the disposal of the machine-gun officer for instruction.

4. Details as to the mechanism of the gun, and the drill of machine-gun sections are contained in the handbook of the gun. Instructions as to the course of firing are contained in the Musketry Regulations.

5. The preliminary training, which may be carried out in the neighbourhood of barracks, will consist in instruction in the mechanism of the gun; in the drill and methods of laying, ranging, and firing; in packing and unpacking with limbered wagons.

6. As soon as the men of a section are thoroughly

conversant with the mechanism, are able to recognise without delay the cause of any failure and to remedy it at once, and can drill and handle the gun with precision, their further training will be carried out in open country away from barracks. During this training the sections should be practised in bringing the gun into action; in fire discipline; in fire control; in laying and ranging in every variety of country; in utilising natural cover when advancing into action; and in constructing cover from both view and fire. The men should also be trained in range-finding, judging distance, and in the use of field-glasses.

7. When the section is proficient in these branches of training, the commanding officer will arrange for it to be trained with one or more companies which have reached the more advanced stages of company training, in order that it may be practised in co-operating with other troops and in dealing with such situations as would confront it in war. The periods of preliminary training should be arranged so that the section may be ready for this training, without hurrying through the more elementary work. To enable this to be done it will usually be necessary to begin the preliminary training during the winter training season.

General Principles of the Employment of Infantry Machine Guns

1. The normal duty of the infantry machine gun in war is to assist infantry in every way by its fire, but it may be given an independent rôle at any time, if the tactical situation makes it advisable to do so.

2. The effective use of a machine gun depends largely upon the skill with which it has been brought

into action. Surprise and concealment are very important factors in its employment; for the effect of the gun is much increased by sudden bursts of fire from concealed positions. The tripod mounting makes it possible to take advantage of small features of the ground to obtain cover and to escape an enemy's observation. In order to develop the power of the gun to the utmost the fullest use should be made of natural and artificial cover.

3. The depth of the beaten zone of the machine gun is small as compared with that of collective rifle fire. This makes the effect of small errors in sighting for elevation proportionately greater. A section of machine guns cannot therefore be relied upon to make its fire effective when first opening fire, at distances beyond about 1,000 yards. If observation of fire is possible, elevation may be rapidly corrected, and the fire of the two guns may in that case be very effective up to 2,000 yards, or up to the limit of observation. If there is no observation it will be necessary to employ several guns and expend a large quantity of ammunition in order to obtain adequate assurance of effect beyond about 1,000 yards.

4. By massing the machine guns of a brigade the assurance of fire effect at ranges beyond 1,000 yards is increased, and it is easier to control and direct fire. At shorter ranges massed machine guns may form a conspicuous target, and the control of more than two guns then becomes difficult. Occasions will, however, often arise when the massed guns of a brigade can be brought into action in a well-concealed position within the limits of effective rifle range. Under such circumstances massed guns may produce great effect both in attack and defence.

5. The general considerations which govern the

selection of a target for machine guns are—its tactical importance, its range, and its vulnerability.

Machine guns should seldom engage artillery with direct fire beyond effective rifle range, for in such circumstances superiority of fire will always rest with the artillery if the machine guns are located. Within effective range machine guns, if concealed, should inflict considerable loss on artillery, while oblique fire may be usefully employed up to the limits of long rifle range.

Engagements with thin lines of skirmishers should be avoided unless the range is accurately known, as the risk of disclosing the position of the gun and the expenditure of ammunition involved will rarely be justified by results.

6. It is very important that fire should not be opened until there is a reasonable probability of obtaining the desired result. A section commander must have a thorough knowledge of the capabilities of his guns to enable him to decide when he is justified in opening fire.

7. Machine guns should as a rule only open fire upon targets which are sufficiently large and dense to promise an adequate return for the ammunition expended. Special circumstances may, however, warrant the opening of fire upon less favourable targets. When a machine-gun commander has decided to open fire, the ammunition necessary to secure the results sought should be expended without hesitation.

8. If there is no satisfactory indication of effect, and no special justification for firing at long range exists, it will usually be better to withdraw from action and to await opportunities for effective

intervention.

9. A machine-gun commander should be given definite orders as to his action, but should be allowed full liberty, within the limits assigned to the commander of the body of troops with whom he is co-operating, in carrying out his orders. He should be kept informed of all changes and developments of the situation which may affect his action. Initiative and enterprise are essential to the effective handling of machine guns.

10. Machine guns will usually be sufficiently protected by the dispositions of the troops with whom they are acting. Should a machine-gun commander find himself in an exposed position, he should consult the nearest infantry commander, who is responsible for providing a suitable escort, if in his opinion one is necessary.

11. When a machine gun is in action only those numbers required to work the gun should be with it. Spare numbers, when not employed as range-finders, ground scouts, ammunition-carriers, or on similar duties, should be in covered positions in the vicinity. Groups of men close to machine guns do not facilitate the working of the gun, and make a vulnerable target.

The limbered wagons will be unloaded in positions where they are screened from the enemy's fire and observation.

The commander of the machine-gun section will select a covered position for his small-arm ammunition cart, as close to his guns as possible. (see Section 174).

Choice of Fire Positions

1. Reconnaissance is of special importance in the handling of machine guns. Before bringing his guns into action the brigade machine-gun officer if the machine guns are brigaded, or the battalion machine-gun officer if the sections are working independently, accompanied by range-takers and orderlies, should usually be well in advance of his guns, where he can observe the action of the body of infantry with which he is co-operating. He should carefully reconnoitre suitable fire positions and make all preparations for bringing his guns rapidly into action. During this reconnaissance the machine guns should normally be placed in concealed positions. In any case they should not follow the machine-gun commander so closely as to expose their movements. Alternative positions to which the guns may be moved to meet changes in the situation or to avoid artillery fire should always be prepared.

2. The choice of a fire position must depend upon the tactical requirements of the situation, and upon the object in view; for example, it must depend upon whether it is desired to use covering enfilade or flanking fire, or to act by surprise.

A commanding position is favourable for the development of covering fire, while for other purposes the gun should be sited as low as is compatible with obtaining the necessary field of fire.

3. A clear field of fire, facilities for observation, a covered approach, concealment and cover for the guns and their detachments, and facilities for ammunition supply are advantages to be looked for in a good fire position, but one position will rarely unite them all. In arranging for the concealment of the guns it is important to consider the background. The neighbourhood of landmarks and the tops of

prominent features should be avoided.

4. Their power of all-round traversing and their great effect against deep targets make machine guns specially suitable for position on a flank, whence they can bring enfilade fire to bear. A position in the firing line is rarely suitable, as the fire of the guns may be masked and the enemy's fire drawn on the firing line.

5. The interval between guns in action should be as large as is compatible with effective control, but the front occupied by the massed guns of a brigade should rarely exceed 150 yards.

Machine Guns in Attack

1. Since machine guns are unsuited for maintaining a continuous fire, they will usually best assist the infantry by withholding their fire during the earlier stages of the battle, so as to be able to intervene at more critical periods. Machine guns allotted to a protective detachment will, however, always be employed so as best to assist the detachment in its special duties (*Field Service Regulations*, Part I., Chap. V.).

2. It will depend upon the general situation whether the machine guns should be placed under the control of the brigade machine-gun officer or left with the battalions to which they belong. When the facilities for concealment and control at effective range are good, and the brigade is engaged in a decisive attack, the best results will usually be obtained by unity of command. By a timely concentration of fire machine guns may thus be the deciding factor in the struggle for superiority of fire.

When control is difficult, or when the brigade is

extended over a wide front, it will usually be better to leave guns with their units.

3. It will often be advisable to employ both methods and to leave their machine guns with the battalions which are first extended, while those of reserve battalions are placed under the command of the brigade machine-gun officer.

4. Although machine guns can move with deployed infantry under fire, they should rarely attempt to keep pace with attacking infantry. When they have gained a position from which they can effectively support their infantry in the struggle for fire superiority and in the assault, they should only be moved for good and sufficient reasons. The difficulties of ranging and of concealment on the move usually outweigh the advantages of decreasing the range.

5. Machine guns will usually find opportunities for employment in the attack in assisting the advance of their infantry by means of covering fire; in protecting attacking infantry against counter-attack or against cavalry; in assisting the infantry in the fire fight, and in preparing for the assault by sudden bursts of converging fire against the objective of the attack. They will also be of value in securing localities which have been seized during the advance, and can assist local reserves in acting as points of support to the attack.

Machine Guns in Defence

1. In defence, as in attack, the fire of machine guns should usually be withheld until the more critical stages of the battle. Premature opening of fire is liable to expose the position of the machine guns to the enemy's artillery.

2. Machine guns may either be dispersed to command approaches, defiles, exits from woods, etc., by which the enemy may advance, to occupy advanced posts, and to bring enfilade fire to bear upon salients and upon the ground in front of weak parts of the position, or they may be massed and employed under the orders of commanders of sections.

3. When the guns are massed the alternative positions, Sec. 167 (D) 1, should be such that the firing line can be assisted during the crisis of the fight, and the advance of local and decisive counter-attacks can be covered and prepared. When covered approaches can be provided, massed machine guns should usually be withdrawn, after they have achieved their immediate object, and should await another favourable opportunity for action.

ITALY

GUN.—The Perino machine gun has been adopted. The barrel is surrounded by a cooling tube containing water, and the gun fires the same cartridge as the infantry rifle. It is regulated to fire 425 rounds a minute, and has a maximum rate of 500 rounds. It can be fired continuously with the automatic action, or intermittently. It is loaded by a ridged metal clip containing 25 cartridges, 10 of which clips are formed into a magazine. It is claimed that this clip is superior to the belt on account of the ease with which it can be recharged. The gun weighs 27 kilograms, which will be reduced to 23 in future manufacture. It is mounted on a provisional tripod, which is of a good pattern, but is said to be too heavy, and the weight is to be reduced to 20 kilograms.

The gun can be fired from any height above the ground by moving the legs of the tripod.

The mechanism is strong and simple, the range is the same as the rifle, and it is very accurate at all ranges.

The Perino machine gun was adopted on the recommendation of a Commission, who tested it against the Maxim and reported it to be more efficient.

They recommended the following organisation:

ORGANISATION.—Four machine guns are attached to each regiment of cavalry and infantry, and two guns to each Alpine battalion. The detachments recommended are:

For cavalry: 1 N.C.O., 5 men, 7 horses, per gun.

For infantry: 1 N.C.O., 4 men, 2 mules, per gun.

Ammunition.—No details have been settled as to the amount or method of carrying.

TACTICAL.—No official instructions for the tactical handling of machine guns have yet been issued.

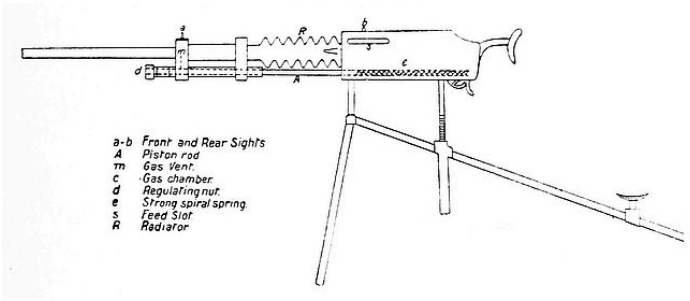
JAPAN

GUN.—The Japanese have adopted the Hotchkiss, [68] the barrel of which is air-cooled, having seven radiating gills on the breech to absorb the heat. The bore is ·256, being the same as the rifle; the weight is 70 lb. It is regulated to fire at a maximum rate of 600 rounds a minute. It is loaded by brass clips containing 30 cartridges inserted into the left side of the gun. The empties are ejected on the right side. The gun is sighted up to 2,187 yards, with a tangent sight, and is mounted on a tripod weighing 40 lb.,

which has an all-round traverse, and can be adjusted to fire from two heights. Shields were used in the late war, but were discarded on account of the weight. It is probable that detachable shields, large enough to cover the detachment, will in future be issued with machine guns for use as the situation requires.

DIAGRAM VI

Diagram of Japanese Machine Gun—Tripod Mount.



a-b Front and Rear Sights.
A Piston rod.
m Gas Vent.
e Gas chamber.
d Regulating nut.
e Strong spiral spring.
s Feed Slot.
R Radiator.

The Japanese machine gun is of home design and manufacture, and belongs to that class in which the mechanism is actuated by the action of gas pressure operating upon a plunger or piston and not by the direct force of recoil as in the Maxim. It uses the same ammunition as the infantry rifle (murata calibre ·256), and is rated as firing 600 rounds a minute. Two forms of mountings are employed, the tripod and the wheeled; the former for fortress use, and the latter for mobile troops. Referring to the

plate, a gas vent *m* communicates with a gas chamber *c* attached laterally to the barrel. The pressure in the gas chamber is regulated, within limits, by the nut *d*, which varies the capacity of the chamber. The piston-rod *A* is acted upon by the gas pressure at its forward end, and is driven to the rear against a strong spiral spring *o*, which moves the piston end forward after the gas pressure has ceased to act. The reciprocating motion of the piston-rod actuates the mechanism, which is entirely enclosed in the housing, and performs the various operations of feeding, firing, and ejecting through a suitable train of gearing. Cooling is effected by the radiator *R*, a circumferentially grooved mass of metal attached to the barrel. The cartridges are mounted on a strip of sheet brass from which clips are punched and bent round the cartridges to hold them in position. A series of holes along the edges of the brass strip engage the teeth of pinions which feed the strip forward as the piston *A* moves backward and forward. The cartridges are fired from their clips by fingers, and drop into position when the bolt is withdrawn. Thirty cartridges are mounted on one strip, which is fed into the slot *s*, from the left side. The trigger must be kept down by pressure all the time, otherwise the spring *o* cannot operate to return the block forward. The gun is provided with a shoulder piece and gunner's seat, as shown. The gun alone weighs about 73 lb., and with tripod 115 lb. It is sighted to 2,000 metres. The gun is stated to work very satisfactorily, and, owing to the positive motions, jamming does not occur easily.

ORGANISATION.—At the close of the war each of the two cavalry brigades was equipped with 6 machine guns and each infantry regiment with 3 guns, and it was contemplated to increase the

allowance to 6 guns for each regiment, infantry or cavalry. The guns are served by infantrymen who are extra-regimental and selected from men having mechanical knowledge.

Guns are organised as follows:

Infantry.—Batteries of 6 guns, each subdivided into 3 sections; each infantry regiment has one battery attached to it.

The personnel of the battery consists of 1 captain (or lieutenant), 1 W.O., 1 bugler.

Each gun has 1 commander (sergeant or corporal), 1 firer, 1 loader, 3 ammunition carriers.

TACTICAL.—Tactically, the guns are used primarily for defence, and reserve their fire for short ranges up to 600 or 800 metres. On the defensive line of the Third Army after the battle of Mukden many machine-gun emplacements were noted. These consisted mainly of blinded casemates, 8 ft. wide, 10 ft. deep, and 3 ft. 6 in. high, and from 18 to 24 in. of overhead cover. Importance is attached to concealing the guns, and it was claimed that none had been knocked out by Russian artillery. In the cavalry brigades the machine guns were organised into sections of 2 guns under an officer, so that sections could be detached with squadrons.

In the First Cavalry Brigade, General Akiyama, 4,000 rounds per gun per day was the greatest rate of fire attained. Machine guns were popular in the Japanese army, and were highly spoken of by the officers.[69]

Cavalry.—Each cavalry brigade has an 8-gun battery, which is divided into half batteries of 4 guns each. The personnel of the battery consists of 1

captain, 2 subalterns, 1 W.O. (sergeant-major), 2 N.C.O.'s, 2 trumpeters. The gun detachments are the same as for infantry, with 3 mounted men per gun in addition.

TRANSPORT. *Infantry.*—30 horses, 6 of which carry guns and tripods, and 24 carry the ammunition. One ammunition horse follows each gun, and the remaining 18 under the W.O. form the battery ammunition column. Each ammunition horse with the guns carries 15,000 rounds in two boxes, and each horse with the ammunition column 2,160 rounds in four boxes.

Cavalry.—Guns and tripods are carried on horses with 32 ammunition horses, each carrying 2,400 rounds.

Total establishment: 3 officers; 87 rank and file.

NOTE.—The organisation during the war was as follows:

Each cavalry brigade had a battery of 6 guns (Hotchkiss pattern made in Japan). These were mounted on a heavy limbered carriage with pole draught and 4 horses; these carriages were clumsy, heavy, and conspicuous, and weighed 15 hundredweight. There was a fixed shield on each carriage and a rough tripod was also carried.

Tactical

The Japanese have issued a well-illustrated drill book for the use of machine-gun batteries, with cavalry and with infantry respectively, with a view to enable them to manœuvre accurately and easily in all situations. Their tactics are at present (1909) under revision, and it is understood that there are likely to be many changes introduced owing to the

lessons of the late war.

The following is the most recent summary of the principles of their tactics:

Machine guns are used as batteries, but may be broken up into sections or even single guns. It is thought wrong to employ “slow” fire, and 800 yards is considered the most useful range. Well-hidden lines of skirmishers and other machine guns are unsuitable targets, and they are never to be used to replace artillery or to fire at artillery at long range, though they may do so at close range or from the flanks or rear. Concealed positions are recommended, and the use of alternative positions advocated, and change of position should be made on the initiative of the commander. Wide intervals between the guns should be used, but the battery front should not exceed 110 yards. The guns should be used on the flanks or rear of the enemy when possible. All ranges should be measured.

Machine guns should be used in the attack just before the final assault, and in the defence when repelling the assault or to reinforce a threatened flank. In both attack and defence they are to be held back, and fire reserved for the crisis of the action.

Use with the advance guard is not desirable as a rule. It is strongly advocated with a rear guard, owing to their intense fire, rapidity in ceasing fire (breaking off action), and mobility. The officer commanding machine guns must be accurately acquainted with the plans of the G.O.C., but must act on his own initiative in forwarding the general scheme according to the situation. Communication with the G.O.C. is considered vital. The guns are considered especially valuable in covering the retreat of infantry. Concealment from the enemy while

manœuvring and surprise by sudden fire are considered essential to their success.

Regulations with the Infantry, 1907

Art. 67.—In the offensive the battery is at first kept in reserve; but when its intervention becomes necessary during the general engagement, to prepare the assault on a point in the enemy's position, they will be given orders to come into action.

The employment of machine guns is especially advantageous to prepare an infantry attack. They can co-operate with this attack even under heavy fire, without, however, being obliged to follow the infantry. The battery ought often to change its position, at the discretion of its commander, to lend its support to the infantry. The battery will, if possible, take up a dominating position or will establish itself on a flank in order to open fire on the selected point of attack, in such a way as not to be marked by its own infantry.

Art. 69.—In the offensive in case of success: The machine guns will rapidly and boldly move to a favourable position to pursue the enemy with their fire and to make their infantry powerless to attempt a counter-attack. The energetic action of the machine guns after the position has been carried will force the enemy to scatter.

Art. 70.—In the offensive in case of failures: The machine guns will sacrifice themselves, if necessary, to cover their infantry. They will break down the morale of hostile troops by riddling them with fire without care for their own losses, and will thus facilitate the retreat of their own infantry.[70]

Machine Guns in the late War

All officers are enthusiastic about machine guns. All agree that their chief rôle is defence, even at night, and they are extremely useful in attack. During the battle of Mukden machine guns were used very much in the attack by the Japanese, but it seems that the casualties of the machine-gun detachments were very heavy indeed; one commander thought them especially useful in pursuit.[71]

Remarks by Lt.-Gen. Sir C. J. Burnett, K.C.B.

The value of machine guns is fully recognised. I had a long conversation with the brigade machine-gun officer. He has six machine guns formed as a separate detachment, extra-regimental, and attached to the brigade. Two guns under an officer form the subdivision of his command, and can be detached at will, but no machine gun is ever employed singly. The guns are usually kept at the disposal of the brigadier, and have been used more in defence than attack; they seldom open at long ranges unless on an exceptionally good target. It is rather the rule to reserve the machine-gun fire for decisive ranges. In many actions which cavalry officers described to me, the practice has been to allow the enemy to come within 600 yards before opening fire, and then suddenly to overwhelm him. The principle with such well-trained troops is sound, for the morale "knock-out" of a 10-per-cent. loss suffered in a few minutes is far greater than a similar loss spread over the advance from 1,000 to 600 yards, and the expenditure of ammunition is less. Concealment is an essential feature of the Japanese machine-gun tactics, and the officer told me he had not a single gun put out of action by opposing artillery. The guns have shields; the manipulators of the machine guns

are very expert, and there is now seldom a jam. Like a good *chauffeur*, the Japanese machine gunner knows all the peculiarities of the weapon he fires, and can almost tell by instinct when anything is going wrong. Four thousand rounds is the most that has been fired in a day by three machine guns of the 1st Cavalry Brigade; the number is now increased to six. Throughout the Japanese Army the machine guns introduced during the war are very popular, and instead of three per regiment, six per regiment are being provided.

Report by U.S.A. Officers on Russo-Japanese War

These guns were highly thought of in the Japanese Army, and the propriety of attaching them to the infantry was never questioned. Four or six guns per battery and one battery per regiment were usually suggested, although good arguments have been heard for eight guns in a battery, and the wish for twelve was sometimes expressed.... On the outbreak of war the Japanese expected largely to limit the use of the machine gun to the defensive, but experience soon taught them to widen its field, and later it was used to great advantage on the offensive. Their rapid fire frequently silenced the fire of the Russian infantry, and caused the latter to crouch down in their trenches. When the guns stopped firing the Russians could be seen again popping their heads above the parapet. If the flanks of a line be weak, these weapons can be used advantageously to strengthen them. Six guns were generally recommended for a battery, thus permitting an assignment of two per battalion. One officer of high rank, however, who was heard to discuss this question ably, said he preferred eight guns, and that he would divide these into two equal sections and

assign each section to a battalion, thus leaving the third battalion without any. His idea was to use these guns both on the offensive and defensive. On the offensive he would send them forward among the first lines of the battalion to which they were attached, or reinforce these lines by the guns at an early stage of the action. In this way he would use them as a substitute for infantry reinforcements. This system will enable the regimental commander to hold the third battalion much longer intact for a decisive effort when an opportunity offers. Officers who have had experience with machine guns were opposed to using them singly, saying that never less than two should be at any position not only to obtain volume of fire, but also because a gun can so easily be put out of action. In order to reduce the losses among the men from shrapnel fire to a minimum, they recommend that the guns in a platoon be separated by 20 metres and the platoons by 100 to 200 metres. Artillery fire is looked upon as the most dangerous foe of the machine gun, and in fact the most effective use of the latter on the offensive presupposes the enemy's artillery has been silenced, or at least that its attention is well occupied by friendly batteries. The machine gun is believed to be especially useful in mountainous districts, where the elevated ground often discloses the close formation of the enemy. The Japanese frequently fired it from an elevated position over the heads of their infantry, and in this way, as their battalions advanced, they at times kept down the fire from the Russian trenches.

An officer who commanded one of these batteries at the battle of Mukden, and who later was detailed to lecture to the attachés with the First Army, said that on one occasion there he continued this fire

until the advancing infantry had arrived within 30 metres of the enemy's position. It is claimed the fire should almost invariably be directed against the opposing infantry. The gun is comparatively heavy, and when in action the battery is advancing with the infantry it is sometimes difficult to keep up with the latter, and moreover the men carrying the gun offer a good target; and for these reasons the guns should frequently remain in position as the echelons make their rushes, provided cover is provided and a free field of fire secured. It is not essential that they should be at all times immediately on the line occupied by the infantry, although when the latter, after a considerable advance, meets with determined opposition, some guns should be brought up. This will give a feeling of confidence, and if need be help to check a counter-attack. When advancing under fire, it is often a good plan to move one gun at a time. Battery commanders report good results when firing at long ranges—that is, between 1,200 and 1,800 metres. One thousand five hundred shots per gun is the greatest number I heard of being fired in one hour. These guns were sometimes attached to outposts. The loss among men serving machine guns is usually great, and this requires that a large number be trained in each regiment to use them. One officer of experience with these weapons thought all officers and men selected to work with them should be trained at division headquarters, or at some other central point, in order to secure uniformity of instruction and service.

On a previous occasion I reported that the shield was not generally desired. I wish to modify this statement, as further investigation showed that while different views were entertained on this subject, the consensus of opinion was favourable to the retention

of the shield. The objections to it are that it offers a good target and is more or less difficult to handle on the offensive. Some officers were in favour of using it on the defensive, but not on the offensive. In general, however, it was thought that both on the offensive and defensive it gives material cover and adds confidence and composure. The guns were almost invariably transported on pack-ponies, except, of course, when effecting changes of position under heavy fire, when they were carried by hand. It is understood wheels were occasionally used in some parts of the army, but I never saw the guns transported that way....

Machine guns were also added to the cavalry after the outbreak of the war, there being six to each brigade, divided into sections of two guns under one officer. Sections may be attached to squadrons as required. The guns are used primarily for defence, and their fire reserved for short and mid ranges....

Machine guns played an important part in the siege of Port Arthur, being freely used by both sides. The Japanese gun was a single-barrelled gun of home manufacture, while the Russians used mainly the Maxim automatic. The Russian guns were used with telling effect against the Japanese in the numerous bloody assaults, being trained to cover all the approaches with a murderous fire.

PORTUGAL

On mobilisation machine-gun foot batteries are formed, the personnel being provided from the division to which the batteries are subsequently attached. Each battery consists of 6 guns, and is commanded by a captain. It is subdivided into 3 sections of 2 guns each, commanded by a subaltern.

The gun is provided with a shield and has a tripod mounting, the whole being carried on a wheeled carriage on the march. When coming into action the gun and tripod are taken out of the carriage and carried into position by 4 men.

The weight of the gun, tripod, and shield, amounting to about 175 lb., is unevenly distributed and renders rapid marching impossible, as it must be carried as one piece owing to the complicated attachment of gun and tripod.

The tripod is heavy and rather high, making the gun conspicuous in action, and on steep slopes the mounting is unstable.

The elevating and traversing gear do not give sufficient scope.

The cartridge belt contains 250 rounds. Each section (2 guns) has an ammunition wagon carrying 14,000 rounds for each gun.

RUSSIA

GUNS.—Rexar and Maxim, but the former are being discarded and Maxims alone will be used in future. They are sighted up to 2,000 yards.

ORGANISATION.—Each regiment (4 battalions) has 4 machine guns, and it is intended to increase this to 8 in the future.

The detail of the personnel to each battery of 4 guns is as follows: 2 officers, 50 N.C.O.'s and men, and 35 horses if the guns are on wheeled carriages (36 horses if the guns are carried on pack-horses).

The detachment is armed with the carbine.

For each gun 13 belts of ammunition are carried,

each belt containing 450 rounds.

The weight of the gun is 68 lb., and of the tripod 45 lb.; the total weight carried by the pack-horse being 198 lb.

SPAIN

has 6 groups of Maxim and Hotchkiss guns, which have been recently subdivided into 2 sections. Two new sections were raised in September 1908.

The 14 sections are attached to the infantry brigades.

Pack transport has been adopted.

SWITZERLAND

There are 4 companies, each having 8 guns, which are subdivided into sections of 2 guns each.

The detachments are mounted and the guns are allotted to the cavalry.

The Maxim is the gun adopted by the Swiss Army, and in the Regulations three kinds of machine-gun fire are recognised, viz.:

(1) *Salvoes, for range-finding.*—The 2 guns of a section fire short salvoes of 20 to 25 rounds alternately to get the right range.

(2) *Quick fire.*—This is the normal method, and consists in firing about 100 rounds at a time.

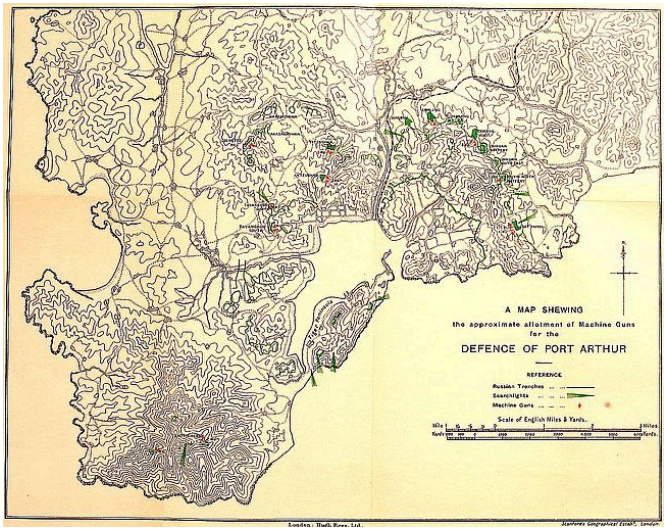
(3) *Rapid fire by individual guns.*—Each gun fires as rapidly as possible; used only as a last resort, or against a specially favourable target.

The section (2 guns) is regarded as the unit, and the spirit of the Regulations is that the machine guns

are particularly for use with cavalry, and must possess to the full the mobility and dash of that arm.

Dismounted action for the cavalry is not favourably regarded, and the machine guns are expected to relieve the cavalry of this duty.

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A MAP SHEWING
the approximate allotment of Machine Guns for the
DEFENCE OF PORT ARTHUR

FOOTNOTES:

[1] Lieutenant A. E. Phillips, in the *Journal U.S.A. Cavalry Association*, July 1909.

[2] The Germans consider its fire value equal to 120 rifles.

[3] Balck's *Modern European Tactics*.

[4] These are still in use in the Territorial Army.

[5] *Journal of U.S.A. Cavalry Association*, July 1909.

[6] United States Official Report of Russo-Japanese War.

[7] See pages 12 and 13.

[8] See Chap. VII., "Cavalry Training."

[9] *Cavalry Training*, 1907, p. 226.

[10] *Field Service Regulations*, Part I.

[11] *Cavalry Training*, 1907.

[12] *France Militaire*, April 15th, 1905.

[13] *Cavalry Training*, 1907, p. 218.

[14] *Field Service Regulations*, Part I. chap. vii. p. 133.

[15] *Cavalry Training*, 1907, chap. vii. p. 229.

[16] Captain F. Culmann in *R.U.S.I. Journal*, August, 1909.

[17] *Infantry Training*, 1905, p. 116.

[18] The Austrian regulations say 1,000 yards.

[19] Captain von Beckmann.

[20] *Times History of the War in South Africa.*

[21] A Japanese machine gun fired 25,000 rounds in one day in Manchuria.—AUTHOR.

[22] *Field Service Regulations*, Part I. p. 119.

[23] *Mitrailleuses à l'Etranger*, par Lieut. M.

[24] *The Great Siege*, by W. Norregaard.

[25] Captain Niessel in *Enseignements techniques de la guerre Russo-Japonaise*.

[26] Captain von Beckmann.

[27] Von Ullrich.

[28] *The Great Siege*, by W. Norregaard.

[29] Von Ullrich, War Correspondent of *Gazette de Cologne*.

[30] British Officer's Report, Russo-Japanese War.

[31] *Ibid.*

[32] *Field Service Regulations*, Part I., 1909, p. 83.

[33] *Field Service Regulations*, Part I., 1909, p. 83.

[34] *Field Service Regulations*, Part I., 1909, p. 85.

[35] *Field Service Regulations*, Part I., 1909, p. 84.

[36] *Field Service Regulations*, Part I., 1909, p. 86.

[37] *Field Service Regulations*, Part I., 1909, pp. 87-9.

[38] Between 400 and 500 is the usual rate of fire.—AUTHOR.

[39] See *Handbook for ·303 Machine Guns*, pp.

88-9.

[40] See map; the Japanese name for this work is Ban-ru-san Nishi Hodai.

[41] See *Field Service Regulations*, Part I., 1909, p. 153.

[42] *The Great Siege*, by W. Norregaard.

[43] *Ibid.*

[44] *The Great Siege*, by W. Norregaard.

[45] Von Ullrich.

[46] *The Great Siege*, by W. Norregaard.

[47] *Field Service Regulations*, Part I., 1909, p. 140.

[48] *Field Service Regulations*, Part I., p. 141.

[49] A great many machine guns were added to the forts from the fleet early in June.—AUTHOR.

[50] *Small Wars, their Principles and Practice.*

[51] *Field Service Regulations*, Part I., 1909.

[52] *Small Wars, their Principles and Practice*, p. 441.

[53] Official Report.

[54] Official History of operations in Somaliland.

[55] Major Gough's Official Report.

[56] Official History of the operations in Somaliland.

[57] From Staff Diary of 1st Brigade.

[58] *Field Service Regulations*, Part I., 1909, p. 173.

[59] Callwell's *Small Wars, their Principles and Practice*.

[60] *Field Service Regulations*, Part I., 1909, Sect. 157.

[61] This system was adopted; see paragraph *re* Organisation, p. 189.

[62] Section 7.

[63] Section 77, Para. 4.

[64] Section 150, Para. 5.

[65] Section 150, Para. (iv).

[66] Section 149, Para. (v).

[67] They should fire with their own companies if it can be arranged that they complete the various parts of the range practice on approximately the same date.

[68] The Hotchkiss loses accuracy after 600 rounds, and becomes red-hot after 14,000 rounds.

[69] U.S.A. Official Reports on Russo-Japanese War.

[70] *Revue d'Infanterie*, March, 1908.

[71] Officer's report, U.S.A., Russo-Japanese War.

TRANSCRIBER'S NOTE

Obvious typographical errors and punctuation errors have been corrected after careful comparison with other occurrences within the text and consultation of external sources.

Except for those changes noted below, all misspellings in the text, and inconsistent or archaic usage, have been retained.

Pg 57: 'moral action' replaced by 'morale action'.
Pg 70: 'should aways' replaced by 'should always'.
Pg 114: 'moral effect' replaced by 'morale effect'.
Pg 119: 'M. Ulrich' replaced by 'M. Ullrich'.
Pg 125: 'moral effect' replaced by 'morale effect'.
Pg 133: 'moral effect' replaced by 'morale effect'.
Pg 152: 'same fate befel' replaced by 'same fate befell'.
Pg 173: 'moral effect' replaced by 'morale effect'.
Pg 183: 'moral effect' replaced by 'morale effect'.
Pg 220: 'moral effect' replaced by 'morale effect'.
Pg 222: 'he held in' replaced by 'be held in'.
Pg 258: 'the moral "knock-out"' replaced by 'the morale "knock-out"'.

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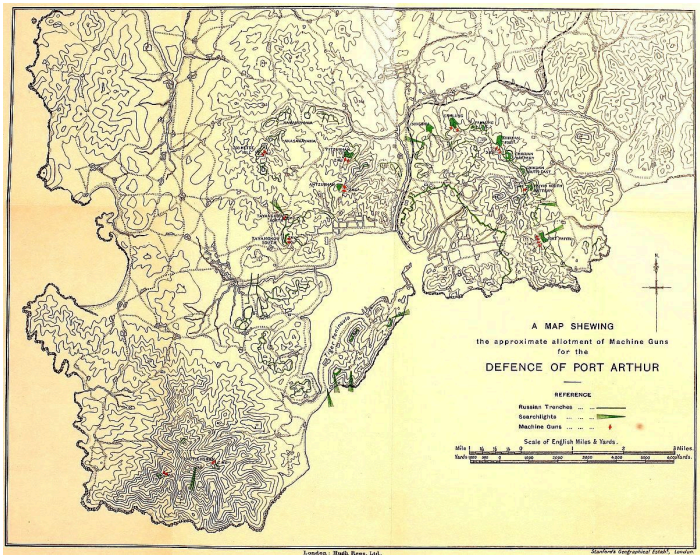
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