THE MADSEN MACHINE RIFLE

MAIN CHARACTERISTICS

ORGANISATION AND TACTICAL USE

INVENTED, DESIGNED AND MANUFACTURED EXCLUSIVELY BY:

DANISH RECOIL RIFLE SYNDICATE

(DANSK REKYLRIFFEL SYNDIKAT)

FRIHAVNEN, COPENHAGEN, DENMARK

MADSEN MACHINE RIFLE: (Model Alfa)

Weight (without accessories) ... 16 lbs.

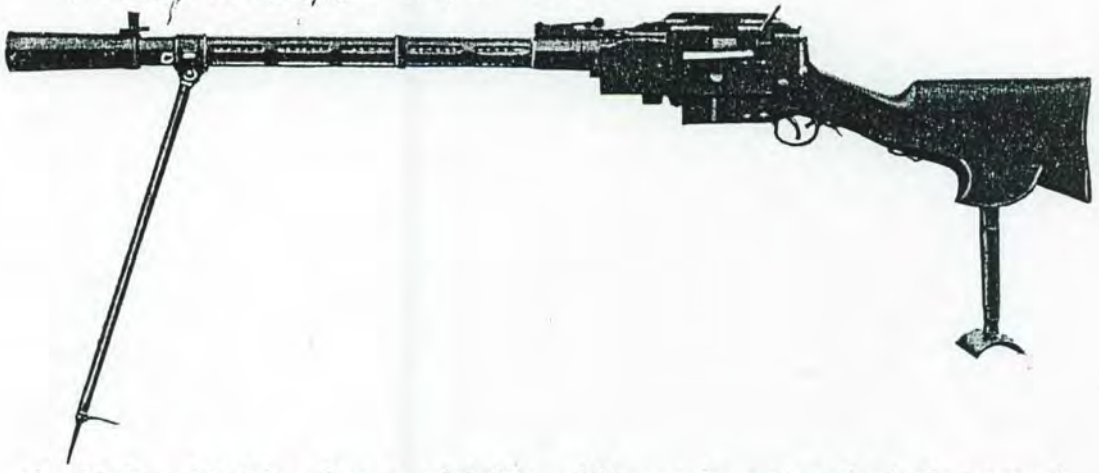
Firing Capacity: 10 shots per second, 400 shots per minute including time for changing magazines, 12,000 shots per hour, including time for barrel changing which operation takes 12 seconds.

Also: single shots with rapidity at will up to about 100 shots per minute.

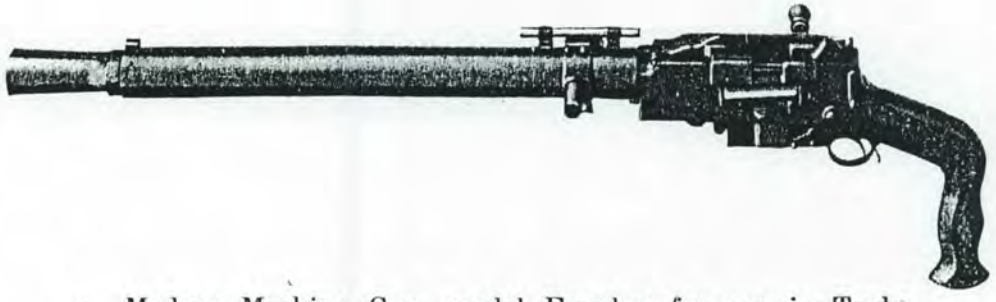
a. Madsen Machine Rifle, model Alfa.

b. Madsen Machine Rifle, model Beta.

c. Madsen Machine Gun, model Eta.



d. Madsen Machine Gun, model Eta with muzzle rest and stock support.



e. Madsen Machine Gun, model Epsylon for use in Tanks.

THE MADSEN MACHINE RIFLE

MAIN CHARACTERISTICS

INTRODUCTION.

The correctness of the following claims has been proved during the trials carried out with the 1915 model at the Machine Gun School B. E. F. in France, with the 1918 model in England at the School of Musketry, Hythe, at the Royal Small Arms Factory, Enfield, and at trials in May 1918 before the Trained Machine-Gun Officers of all Units of the London District Command.

The 1920 model (almost identical with the 1919 model) is a further improvement of the model of 1918 and the gun is now provided with an efficient flash-absorber. The model of 1919 was submitted to exhaustive trials in England by the New Zealand Expeditionary Force and stood every test brilliantly. The Danish Recoil Rifle Syndicate maintain that their Madsen Machine Rifle is in every respect superior to any other light machine gun in existence and they challenge all other inventors or manufacturers to submit their guns to r e a l l y e x h a u s t i v e t r i a l s in direct competition with the Madsen gun.

The official reports on the Madsen Gun which are published herewith, testify to the correctness of all claims for the Gun made in this booklet.

THE MADSEN MACHINE RIFLE,

Model 1920, is invented designed and manufactured by the Danish Recoil Rifle Syndicate, of Copenhagen, Denmark. It is an automatic weapon of rifle calibre — firing 400 rounds per minute, — which combines the minimum of weight — *16 lbs.* — with a firing efficiency and endurance almost equal to that of the most efficient *heavy* machine-guns. The Madsen gun is in every respect superior to the Lewis, Hotchkiss, Lyon-Hotchkiss, Chauchat, Browning, Berthier and Beardmore-Farquhar Guns. It is recoil-operated, not gas-operated like the other guns, it is lighter, stronger and more efficient; its barrel can

be changed in 12 seconds; it can keep up continuous rapid fire for an unlimited time, it is very much simpler and better constructed and breakages never occur, its automatic working is much more reliable than that of any other gun under Service conditions and it will stand rough handling which no other gun can withstand.

PROPELLING FORCE:

The Madsen gun is *Recoil*-operated. The Lewis, Hotchkiss, Lyon-Hotchkiss, Browning, Berthier and Beardmore-Farquhar guns are *Gas*-operated.

Recoil-operation offers the following advantages:

1. All powder-gases leave the barrel through the muzzle and therefore do not choke or heat the mechanism.

2. As the mechanism is not heated during firing all component parts preserve their initial hardening and therefore will neither break nor wear out nor deteriorate. Besides a recoil-operated gun with a cool mechanism and casing is far easier to handle during action than a gas-operated gun with overheated mechanism and casing.

3. The recoil is a constant force, wherefore the counterbalancing force, viz: that of the return spring, is also kept constant; this means that the tension of the return-spring will never require readjustment as in gas-operated guns. (In the recoil-operated Vickers Gun however the return spring does require readjustment because this spring is *stretched* and not *compressed as in the Madsen Gun).*

4. No part of the gun requires cleaning, oiling or readjustment while the gun is in action.

5. Water in the barrel or mechanism has no ill effect consequently a recoil-operated gun can be cooled swiftly by plunging it in water and firing can be continued instantly.

6. Variations in the temperature of the atmosphere have no effect on the working of the mechanism.

7. A recoil-operated gun can use a short barrel, while gas-operated guns are bound to use long barrels.

GAS-OPERATION

offers no advantage whatever over recoil-operation but involves a series of disadvantages viz:

1. A portion of the gas is trapped and led into certain parts of the mechanism thereby choking the mechanism so that the gun must frequently be taken out of action and cleaned.

2. The mechanism gets overheated by the gases; this interferes with the initial heat-treatment of various component parts which, subjected to violent automatic working in an overheated state will soon deteriorate, wear out or break. Hence the many breakages that occur with gas-operated guns.

3. The propelling force viz: the gas-pressure diminishes gradually when gas-port and gas-cylinder get choked with the result that a gas-operated gun frequently refuses to work until the tension of the return spring has been readjusted.

4. Gas-operated guns therefore will fall out of action, perhaps in critical moments, to have their mechanism cleaned, oiled and readjusted.

5. Water that gets into the barrel or gas-cylinder may entirely paralyse the automatic working.

6. Variations in the atmospheric temperature greatly influence the automatic working of a gas-operated gun. In snow or on the ice such a gun will frequently be unable to fire.

7. A long barrel is necessary with gas-operated guns, because the gas-port bored in the barrel, must be at a certain distance from the muzzle as well as from the chamber end.

AMMUNITION.

The Madsen M. R. of British pattern fires the ordinary ·303 British Infantry cartridge. Patterns for other countries are designed for their respective Infantry ammunition.

THE WEIGHT

of the Madsen Machine Rifle is 15 lbs. 6 ozs. Including the flash-absorber the weight of the gun complete is 16 lbs. 2 ozs. whilst the weight of the Lewis Gun complete with its lightest mount is 28½ lbs. and that of the Hotchkiss Gun 28 lbs. The weight of the Vickers Gun complete is 76½ lbs. (Gun 28½, tripod 48) plus 10 lbs. cooling water — total *86½ lbs.*

The Madsen gun is the lightest of all existing machine-guns.

In the official report of the New Zealand Expeditionary Force it is said:

> »*The lightness of the gun is gained in the parts where there* »*is not any strain. The parts where strain comes are made extra* »*strong which is not so in the Lewis Gun.*

The following comparison shows that not only the gun itself but also the accessories carried in the field are lighter wih the Madsen gun that with the present British service guns:

	MADSEN		LEWIS		HOTCHKISS	
	lbs.	oz.	lbs.	oz.	lbs.	oz.
GUN complete	15	6	26	0	26	8
FLASH ABSORBER	0	12	no		no	
MOUNTING not necessary with the Madsen	1	12	2	8	1	8
SPARE BARREL not including weight of breech mechanism for the Madsen	3	1	3	9½	10	14½
SPARE PARTS and TOOLS with bag for carrying including complete breach mechanism for the Madsen	5	7	7	14½	6	14½
TOTAL	26	6	40	0	45	13

An attempt has been made in certain quarters to establish a comparison between the weight of the *Madsen Gun with spare barrel*

and spare breech mechanism (total: 21 lbs.) and the *Lewis* gun *without these accessories* (28 lbs.). Such a comparison is of course most unfair. The fact that the Madsen Gun can change barrel in the firing line *in 12 seconds* while it takes *20 minutes* to change the barrel of the Lewis gun is no reason why the Madsen should be put at a disadvantage as regards weight. In the firing line one man may carry the Madsen gun (16 lbs.) while another man carries the spare barrel with breech (5 lbs.); but the Lewis gun (28 lbs.) cannot be divided into two portions when the gun is kept ready for action. While a man can easily carry a burden of 16 lbs. without fatigue, he will soon get tired and even exhausted if bound to carry a burden of 28 lbs. over rough ground.

In a *prolonged action* one Madsen gun with its spare-barrel and breech, (21 lbs.) will do the same work as 3 or 4 Lewis guns (85 or 114 lbs.). The Danish Syndicate are prepared to prove this whenever the Lewis gun is submitted to a *really exhaustive trial* in direct competition with the Madsen Gun.

Also the *magazines* of the Madsen are *much lighter* than those of the Lewis although much stronger.

An empty Madsen magazine (for 40 rounds) weight	20 ozs.
an empty Lewis magazine (for 47 rounds) »	32 »
100 Madsen magazines (for 4000 rounds) weight	2000 »
85 Lewis magazines (for 3995 rounds) »	2720 »
difference on magazines..	720 »
difference on gun, accessories etc.	218 »
total...	938 ozs.

About 59 lbs. therefore are saved in the weight of a Madsen gun with accessories and magazines in the first line.

BARREL.

Although the Madsen Machine Rifle is the lightest of all existing machine guns, it is provided with a thicker and more resisting barrel than that of either the Lewis, Vickers, Browning, Berthier, Lyon-Hotchkiss or Farquhar Guns.

Light machine guns must be provided with comparatively light barrels; but a light barrel is worn out very quickly unless some means are found *to reduce the length of each continuous burst of rapid fire and yet to keep the gun in action for an unlimited time if required.* The Madsen is the only light machine-gun in which this problem is solved. This is done by the use of *two barrels* firing alternatively, a change of barrel taking 12 seconds only.

The longer one makes *each burst* of continuous rapid fire the sooner a barrel will be worn out. The same barrel may withstand say:

(1) N-thousand rounds if fired in bursts of 200 rounds each

or (2) One third of N-thousand if fired in bursts of 500 rounds

or (3) One sixth of N-thousand if fired in bursts of 1000 rounds.

With the Madsen Gun continuous firing can be kept up for an unlimited time and yet long separate bursts be avoided because the barrels are changed so quickly. In actual warfare a Madsen Gun using its two barrels alternatively would practically never be out of action and yet able to withstand not twice as many rounds as a single-barrelled gun but probably ten times as many, before renewal of barrels becomes necessary.

PORTABILITY.

The weight of the Madsen Gun is so well balanced that it is carried and handled almost as easily as a rifle. The firer can advance by rushes at top speed and clear obstacles as easily as an ordinary infantryman. The Madsen Gun is so constructed that *its mechanism and casing remain cold even when the barrel is red hot,* wherefore the gun can be handled and carried with bare hands under all circumstances.

FIRING POSITIONS.

The Madsen M. R. *is fired with ease from the shoulder without any mount or support* (rapid firing or single shots), the rifleman standing, kneeling or lying prone. The recoil is absorbed by the return spring and is therefore not felt. Firing in standing position is of particular importance when fighting at close range, or inside buildings and ruins,

or on flooded, marshy or broken up grounds. The gun is used with bayonet, almost as easily as a rifle. It can also be fired with great accuracy from a light detachable bipod that weighs 1½ lbs. The Madsen M. R. therefore, can be used equally well for long range or accuracy firing, and for short range fighting or in a hand-to-hand struggle.

ACCURACY & TRAVERSING.

The official Report of the Machine gun School, British Army in France, (1915) sums up the accuracy trials as follows:

»*Accuracy:* *good*«.

»*Traversing:* *extremely good*«.

During the trials on Salisbury Plain, August 1919, the following results were obtained:

at 200 yards: 100 % inside circle of 12" diameter
91 % » » » 8" »

at 400 yards: 100 % inside square of 1'9" × 1'4"
75 % » » » 0'5" × 1'3"

at 800 yards: 100 % inside square of 1'11" × 2'3"
75 % » » » 1' 5" × 2'0"

at 200 yards: 15 iron plates 1' × 1' shot down with 19 shots in 1 min. 18 sec.

At another official trial the following results were obtained:

at 1 400 yards: target 50 standing skirmishers, 1 pace interval 100 single shots, 1 min. 30 sec. 46 hits, 30 targets hit.

at 1.000 yards: target 50 standing skirmishers, 1 pace interval 272 shots rapid, 1 min. 30 sec. 100 hits, 39 targets hit.

Surely no other machine gun could obtain better results.

At the School of Musketry, Hythe, (1918), the Madsen Gun with bayonet fixed was fired from the shoulder *without any support*, rifleman standing as well as lying prone, 880 rounds rapid against an embankment at 200 yards range.

The observation by the Experimental Officer is as follows:

»*This was carried out. Firer appeared to traverse top of bank* »*with a remarkable accuracy.*

VISIBILITY.

The gun is nearly rifle-shaped. Beyond about 60 yards range it cannot be distinguished from an ordinary rifle. It has a special device for single shot firing and the 1920 model is provided with a *FLASH-ABSORBER which eliminates the flash.* Madsen Guns, therefore, can be used with all the advantage of *surprise,* as they cannot be detected as machine guns until the desired moment. The New Zealand report states:

»*This gun can be excellently concealed to look like a rifle — »after many attempts it was found impossible to conceal the »Lewis gun under 400 yards.*

RAPID FIRE.

The 40 rounds in a magazine are fired in 4 seconds, and the empty magazine replaced in two seconds. The Madsen Gun, therefore, can fire *400 rounds per minute,* or slower if desired.

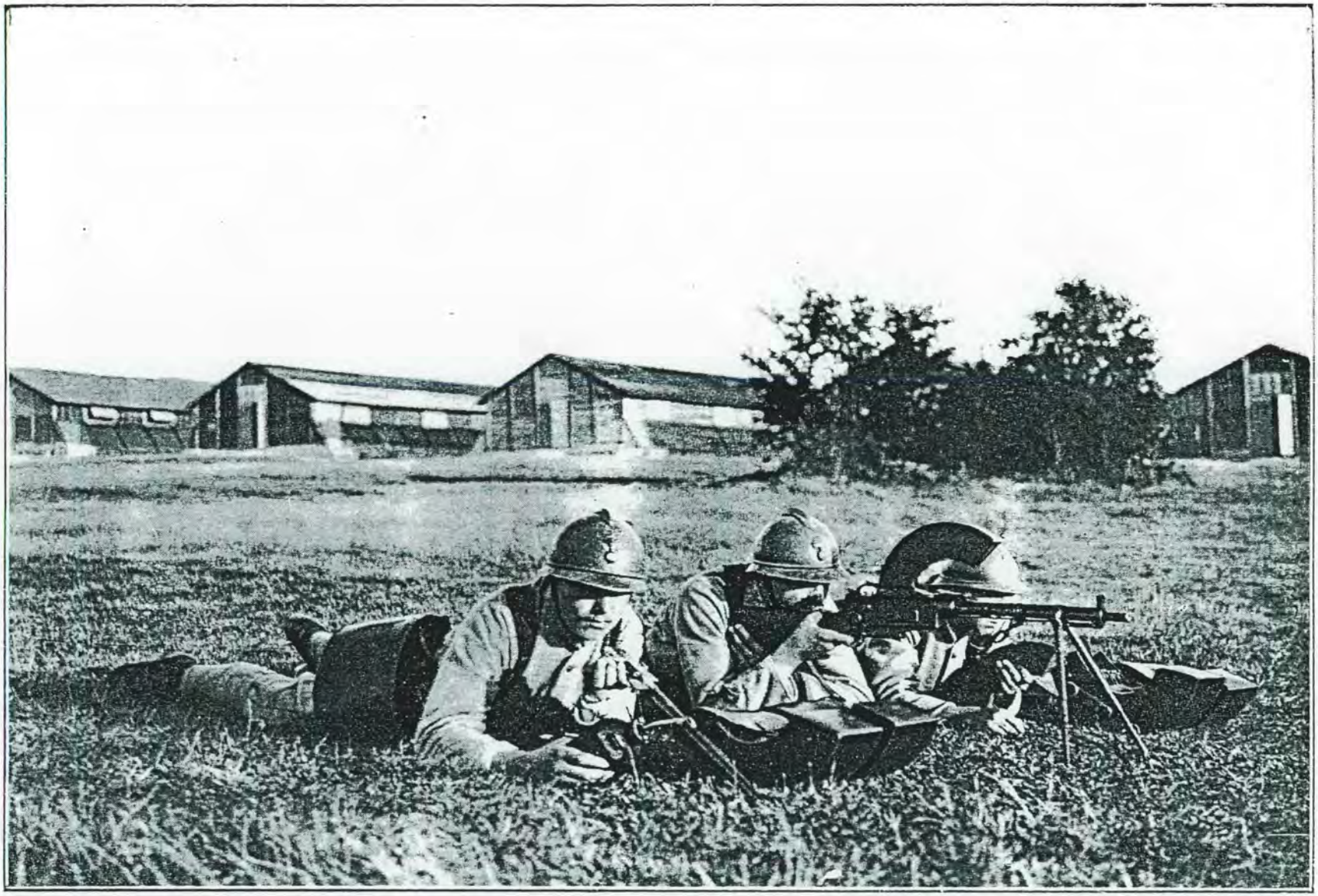
SINGLE SHOTS.

Also slower single shot fire can be used by turning a small swivel into the corresponding position, and then only one shot will be fired each time the trigger is pressed. The Lewis Gun has no such device for single-shot firing.

COOLING ARRANGEMENT.

The Madsen Gun can be cooled either by barrel-changing, water or air.

A second barrel, with complete breech attached (the whole in one plain piece weighing 5 lbs.) is carried in a heat-proof scabbard that holds the barrel conveniently even if red-hot. When the first barrel is heated through firing it is changed — *in 12 seconds* — and firing continued with the Second Barrel whilst the *hot removed barrel is cooled by exposure to the air or with water,* of which an ample supply is carried in small rubber bags on the belts. When the Second Barrel is heated the First Barrel is used again, and so on. *The Rifleman changes the*



barrel without tools, with bare hands, (as the breech remains cold) *remaining in his firing position (standing or lying) and even whilst running:*

The barrel can also be cooled without being removed from the gun by dipping it in water (in a ditch, shell hole, or the like) or by pouring water over it whilst firing. Thus the Madsen M. R. can be used with one barrel only. Neither the Lewis nor the Hotchkiss Gun can be cooled in this way, as they are gas-operated. In the report of the London District Command, May 1918, it is stated:

> »*At certain trials recently the Madsen gun with barrel extremely* »*hot, was thrown bodily into a muddy dyke, the mechanism lite-* »*rally dripping with slime, water etc. and was immediately fired* »*without any cleaning whatsoever, the barrel being effectively* »*cooled by immersion in the water without any loss of firing ef-* »*ficiency.*

At the trial at Bisley in June 1918 is was proved that neither the Lewis nor the Hotchkiss guns could fire a shot automatically after immersion in water while the Madsen was entirely unaffected by the water and mud.

SUSTAINED FIRE.

The chief advantage of the Madsen Machine Rifle is that it can keep up a continuous rapid fire for an unlimited time, the 12 seconds for changing barrels between each series being the sole interruption. In this way 12.000 rounds can be fired in one hour — a most remarkable efficiency for a machine gun that weighs only 16 lbs.

Usually the barrel is changed or cooled after each burst of 400 rounds rapid or even 200 rounds; but *the Madsen gun can fire without difficulty in continuous bursts of 1000 rounds each if required.* The shorter bursts are preferred in order to prolong the life of the barrels, as explained on page 5 und 6.

The official report of all machine-guns Experts of the London District Command (May 1918) lays down for the Madsen Machine Rifle:

> »*Rapid fire can be opened instantaneously and can be con-* »*tinued for an unlimited time. After firing about a thousand* »*rounds continuous in the test, the barrel became overheated. It*

»was then removed by Number One and a new barrel placed in »position in about 15 seconds. This operation was carried out in »all firing positions and without employment of any tools. The »overheated barrel was cooled by water. It appeared immaterial »whether the water was clean or muddy.

COMPARISON WITH OTHER SYSTEMES.

In respect of sustained fire, the Madsen Machine Rifle is superior to all machine-guns of other systems.

With the *VICKERS GUN* (86 lbs. complete with mount) the cooling water boils after 600 rounds continuous fire and has evaporated after about *1.000 rounds.* To refill the water-jacket thereafter, *firing must be interrupted for at least 3 minutes.*

With the *LEWIS GUN* (28½ lbs. with mount) the *entire gun,* mechanism and body as well as barrel, is overheated after 800 to 1.000 rounds continuous rapid firing. *After that, the gun must be taken out of action for 20 to 30 minutes to cool down,* and must be dismantled to have the gas cylinder cleaned and oiled and the return spring adjusted. In the meantime, the Lewis Gun is as useless as a log of wood. It is obvious that a machine-gun able to maintain rapid fire for 2 to 3 minutes only, with intermittent pauses of 20 to 30 minutes, is inefficient in modern warfare. The tactics used by the Germans of attacking in huge masses, one dense wave following close upon the other, were obviously based upon this fundamntal defect of the Lewis Gun. The first attacking waves were sacrificed to »heat the British guns«, while the succeeding waves to press home the attack when the Lewis and Hotchkiss guns had reached their limit of fire jammed and fell out of action.

In the House of Lords 6th June 1918, Admiral Lord Beresford stated:

»There have been thousands of men killed and hundred of »trenches lost on account of the jamming of the Lewis gun .... »This gun (the Madsen) does not jam.

On the same occasion Lieut. Colonel Lord Penrhyn stated:

»I am informed that the Germans know perfectly well when »our Lewis guns are out of action and that their rushes in waves »are to a very considerable extent timed to meet the occasions »when our Lewis guns happen to be out of action. With the Mad-

»sen gun you could change the barrel in fifteen seconds and go »straight away.

To change the barrel of the Lewis Gun requires practically total dismantling of the gun and takes about 20 minutes. Neither the Lewis nor the Hotchkiss Gun can be water-cooled. In the »Machine Gun Manual«, page 81, it is laid down that

».... all traces of water must be removed from barrel, bore and »gas cylinder .... Until all water is blown out of gas-cylinder, »the gas pressure will be insufficient for ensuring automatic »working.

This, of course, means that it is impossible to watercool these guns during action.

As regards the *Hotchkiss Gun* (28½ lbs.) the Official British Cavalry Report of May 1918, comparing this gun with the Madsen lays down the following:

»A change of barrel with the Madsen is only necessary after »firing a thousand rounds as against five hundred with the Hotch- »kiss; and again with the Hotchkiss, one cannot continue unlimited »fire with two barrels only, unless time is given for one barrel »to cool, but with a pool of water or using the water carriers pro- »vided with the Madsen Equipment, Madsen barrels are fit for »use within a few seconds of changing. This feature makes them »suitable for a prolonged action. After firing about 500 rounds »with the Hotchkiss, the mechanism gets clogged with brass fillings »and dirty oil burnt by heating of the gun, and the gun must be »stripped and cleaned. This takes a considerable time.

»The mechanism of the Madsen is totally unaffected by dirt, »dust or sand. There are no brass fillings and dirty oil has no »effect.

»Changing barrel with the Madsen can be done by one man in »twelve seconds. Changing barrel with the Hotchkiss requires two »men; this operation causes a considerable amount of movement »and exposure.

Further, the Hotchkiss must have its gas-cylinder cleaned and oiled and the return spring adjusted before it can be used again, whilst it is laid down in the Report that »with the Madsen no adjustments or any cleaning or oiling are necessary during action«. In other words, the

Madsen can keep up continuous rapid fire for any length of time with only 12 seconds interruption after each series of up to 1000 rounds whilst the *Hotchkiss* can fire only in short series with *very long intermittent pauses.* The Hotchkiss, therefore, is reduced to the same state of impotence nearly as quickly as the Lewis, and must be taken out of action after a few minutes firing. In addition, the automatic working of the Hotchkiss Gun is extremely bad under Service conditions. *It was for these reason that the Hotchkiss (or Béné Mercier) Gun was turned down as unserviceable by the American Army after having been in use as a general service weapon.*

MAGAZINE.

The Madsen Machine Rifle uses magazines of steel, each containing *40 rounds.* The magazines are very securely held in position when placed on the gun; nevertheless, they are replaced in two seconds. The Madsen magazines are very strong; they will stand being walked upon, kicked about, thrown on to hard ground and similar rough handling without causing any stoppage in the firing of the gun. With the Lewis and Hotchkiss Guns, the slightest deformation of the magazines will immediately cause the guns to jam, because the magazine forms part of the mechanism. The Madsen Magazine is merely an exterior casing for the cartridges and has no relation with the mechanism of the gun. When in position the magazine is covered by the firer's head and helmet so that it cannot be seen by the enemy.

In spite of their greater strength, the Madsen Magazines are much lighter than those of the Lewis gun; as set forth on page 5 there is a saving of 45 lbs. in favour of the Madsen on the dead weight of magazines for 4000 rounds besides the 14 lbs. saved on the gun etc.

The Madsen, but not the Lewis gun, can use magazines of aluminium, thus obtaining a further great saving in weight. The shape of the Madsen magazines is an ideal one for transport and handling, whilst most fighting men agree that the drum-shaped Lewis magazines are very inconvenient to handle and to pack.

The Madsen gun can fire *without magazines, fed by hand* at the rate of 60 rounds per minute. This is important if the gun gets separated from its magazines or there has been no time to refill them.

THE FEED MECHANISM

is extremely simple and positive so that the Madsen M. R. can be fired in all positions from vertically upwards to vertically downwards.

The New Zealand Expeditionary Force state in their official report:

»*Loading mechanism absolutely efficient giving positve feed,*
»*no chance of cross or double feed as each cartridge is automati-*
»*cally separated from following cartridge. This is a great advan-*
»*tage over the Lewis gun. There are no springs to get jammed*
»*or broken. Mechanical action so arranged to obviate any part*
»*wearing.*

LOADING.

The Madsen is loaded with a pull of the cocking-handle only for the first magazine; loading for the succeeding magazines is performed automatically without using the cocking handle. In this way, time and effort are saved and the firer can keep continuous observation of his target. The cocking handle remains immobile during firing. The Vickers, Lewis and Hotchkiss Guns are without these advantages.

UNLOADING.

The magazine is removed (whether empty or still containing cartridges) and the last cartridges ejected with a pull of the cocking handle.

FIRING MECHANISM.

The New Zealand Report says:

»*Firing Mechanism excellent. By adjusting a small lever under*
»*the trigger guard single shots can be fired without the necessity*
»*as in the Lewis Gun of special loading of magazine or movement*
»*of the cocking handle.*

EJECTION.

The empty cartridge cases are automatically ejected downwards and slightly forwards, thereby causing no inconvenience either to the rifleman or to the men next to him in the firing line. With the Lewis and

Hotchkiss Guns the hot cartridge cases are ejected violently to the side, causing great inconvenience to the men near the gun.

MECHANISM.

The mechanism of the Madsen Machine Rifle is extremely simple and chiefly constructed on the cam-and-groove principle, which is the best existing. The bearing surfaces are long and large and slide smoothly against each other without undue friction or violence. *Jamming never occurs* with the new model of the Gun and was practically out of question even with the older models.

In the official report of the Commandant, Machine-Gun-School, British Army in France (1915) it is laid down that the Madsen Machine Rifle:

> *»is mechanically sound, is well constructed and not subject to »failure. I recommend this rifle strongly to your notice and sug- »gest that a number of them be ordered for issue to units.*

In the official report of the School of Musketry, Hythe, Jan. 1918, it is stated that:

> *»the gun functioned correctly .... There was little liability to »jam, and jams are easily cleared. Mud in the magazine had little »effect.*

In the official report of H. M. S. »Excellent«, Whale Island, it is stated:

> *»By this time, the gun was throughly covered with grit and »dust. The gun was then loaded and fired without any trouble. »A certain amount of grit had got into the mechanism through »the magazine-holder, but this had no effect on the operation of »the mechanism. The gun was then immersed in salt water for »5 minutes with the grit still in it. On being taken out of the »water it was loaded and fired correctly.*

The Officer Commanding the Zululand Mounted Rifles after having used Madsen Machine Rifles (Rexer guns) in the Natal Rebellion of *1906*, reported inter alia, as follows:

> *»During the time the guns have been in use, not one single*

»instance of cartridge jamming has occurred, a valuable point »that needs no comment.

After 15 years' improvement, the mechanism of the Madsen Machine Rifle has in fact reached absolute perfection. Its unfailing automatic working even under the most difficult Service conditions and in spite of mud, earth, sand, water, dust, etc. (within reasonable limits) is indeed one of the most important advantages of the Madsen Machine Rifle. At a trial with the Brazilian army, one Madsen Machine Rifle fired 26.000 rounds without a single failure or stoppage. At another trial *69.000 rounds were fired from one Madsen Gun without a single stoppage or jam occuring.*

The gun will not require any cleaning whilst in action and vill fire correctly without lubrication.

ROUGH HANDLING.

The Madsen gun and its magazines are very strongly built and will stand the roughest handling on the battlefield. In the official report of the London District Command, May 1918, it is stated:

»The gun was twice thrown ten or twelve feet up into the »air and fell on hard ground; the magazines were kicked and »stamped on. The gun fired correctly and without any stoppage »immediately after.

»No Lewis gun would have stood the rough treatment to »which both the gun and magazines were subjected.

Similar trials were carried out many times with the same gun also at the School of Musketry, Hythe, with equally good results.

SAFETY.

Immediately after the firer releases the trigger, the fire will stop and the barrel with the breech be automatically caught in its rearward position, *leaving the chamber empty.* Under no conditions can there be a cartridge in the chamber when firing has stopped, and accordingly all danger of a misfire caused by the heat of the barrel is eliminated.

TRAINING.

In the report of the School of Musketry, Hythe, (1918) on the Madsen Machine Rifle, Model 1918, it is stated:

»*Instruction on the mechanism is very easy to impart.*

In the Infantry Report from the London District Command, May, 1918 it is stated:

»*A Non-Commissioned Officer who had only two hours instruc-*
»*tion was able to fire the gun correctly and to strip it in 30 seconds.*
»*Its simplicity from an instructional point of view appears*
»*to be of great importance. The Company's claim that a few*
»*days should be sufficient to train troops, who have had previous*
»*knowledge of Machine Guns, appears to be justifiable.*

In the official *Cavalry Report* on the Madsen Gun (May 1918) it is laid down:

»*As regards the training of troops in the use of this weapon*
»*its advantages are pronounced, and a considerable amount of*
»*time can be saved. The question of stoppages is almost obliterated,*
»*the handling of the rifle is extremely simple, and with twelve*
»*hours' training a man would be quite efficient in the handling*
»*of gun and mechanism, and given sufficient ammunition for*
»*training purposes, an effective shot within a week.*

GENERAL CONCLUSIONS.

In the *official British Infantry Report (May 1918)* the following conclusion is drawn:

»*The general impression produced by these trials is a very*
»*favourable one. All observers were unanimous in the opinion*
»*that the Madsen Machine Rifle has a great advantage over the*
»*Lewis and Hotchkiss Guns in weight, simplicity and firing effi-*
»*ciently.*
»*Moreover the fact has been demonstrated that a sufficient*
»*knowledge of the gun can be acquired in a few hours. This appears*
»*to be a very important point having regard to the time and*
»*labour necessary for the training of efficient Lewis gunners.*

The conclusion contained in the *official British Cavalry Report* (May 1918) is as follows:

> »*From a cavalry point of view, from what has been seen* »*during the past few weeks of the Madsen Machine Rifle both* »*on the range and from practical experience gained we are of* »*opinion that this weapon is vastly superior to any light automatic* »*gun we have yet seen and certainly superior in every way to* »*the Hotchkiss Automatic Gun with which the Cavalry are now* »*armed. With a weapon almost as easily used as a Rifle, and with* »*its simplicity and apparent reliability the Cavalry would have* »*an extremely powerful and concentrated fighting force without* »*losing its mobility.*

THE GENERAL OFFICER COMMANDING THE CANADIAN MACHINE GUN CORPS

during the war made a detailed report on the Madsen Gun after trials in June 1918. He summarizes his opinion as follows:

> »*The only thing which is not satisfactory is the large flash* »*emitted by the present model. If this is corrected, and I am* »*confident it can be done, the Madsen will be without question* »*the best automatic Rifle at present available.*

This defect is now entirely corrected; the new flash absorber *eliminates the flash at day time,* and reduces it *at night time* to look like a flash from an ordinary rifle.

THE NEW ZEALAND EXPEDITIONARY FORCE

have submitted the Madsen Gun to exhaustive trials in August and September 1919, and an official report was drawn up by the Colonel in charge of the trial ending with the following general conclusion:

> »*The Detachment Commanders and myself are convinced that* »*the Lewis gun possesses no advantage whatever over the Madsen* »*Gun while the Madsen in our opinion is far ahead of the Lewis* »*Gun. We strongly recommend that the Madsen Gun be adopted* »*in New Zealand in place of the Lewis Gun.*

The Lewis and the Hotchkiss Guns that are adopted as service weapons for the British Infantry and Cavalry, are practically speaking, no longer in use in any other country not even in the countries of their origin viz. America and France.

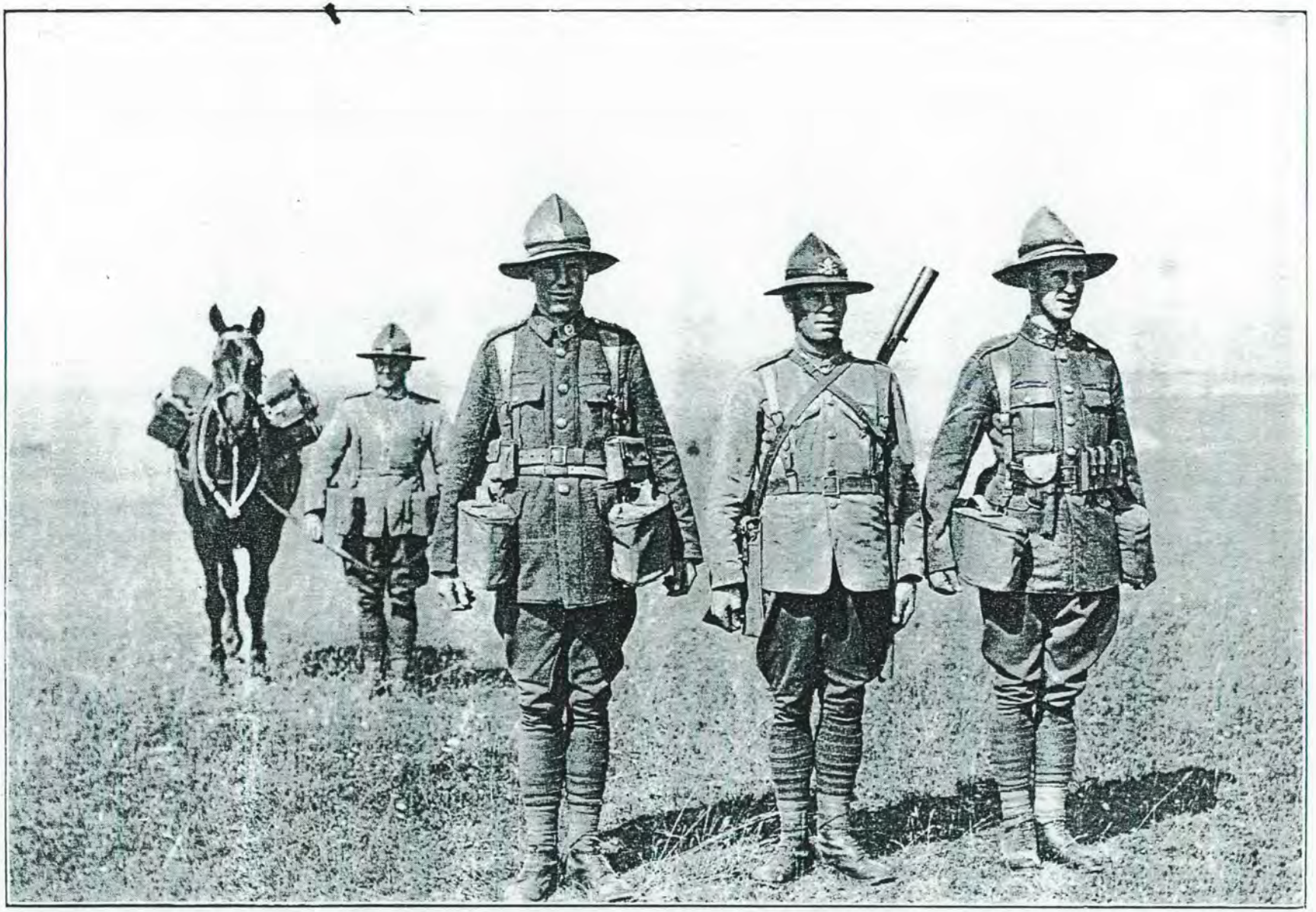
Although the Lewis Gun is the invention of an American officer it was emphatically refused as unserviceable for war on land, by the United States War Department. The U. S. Marine Corps were armed with Lewis guns when they landed in France but were obliged to discard these guns shortly afterwards.

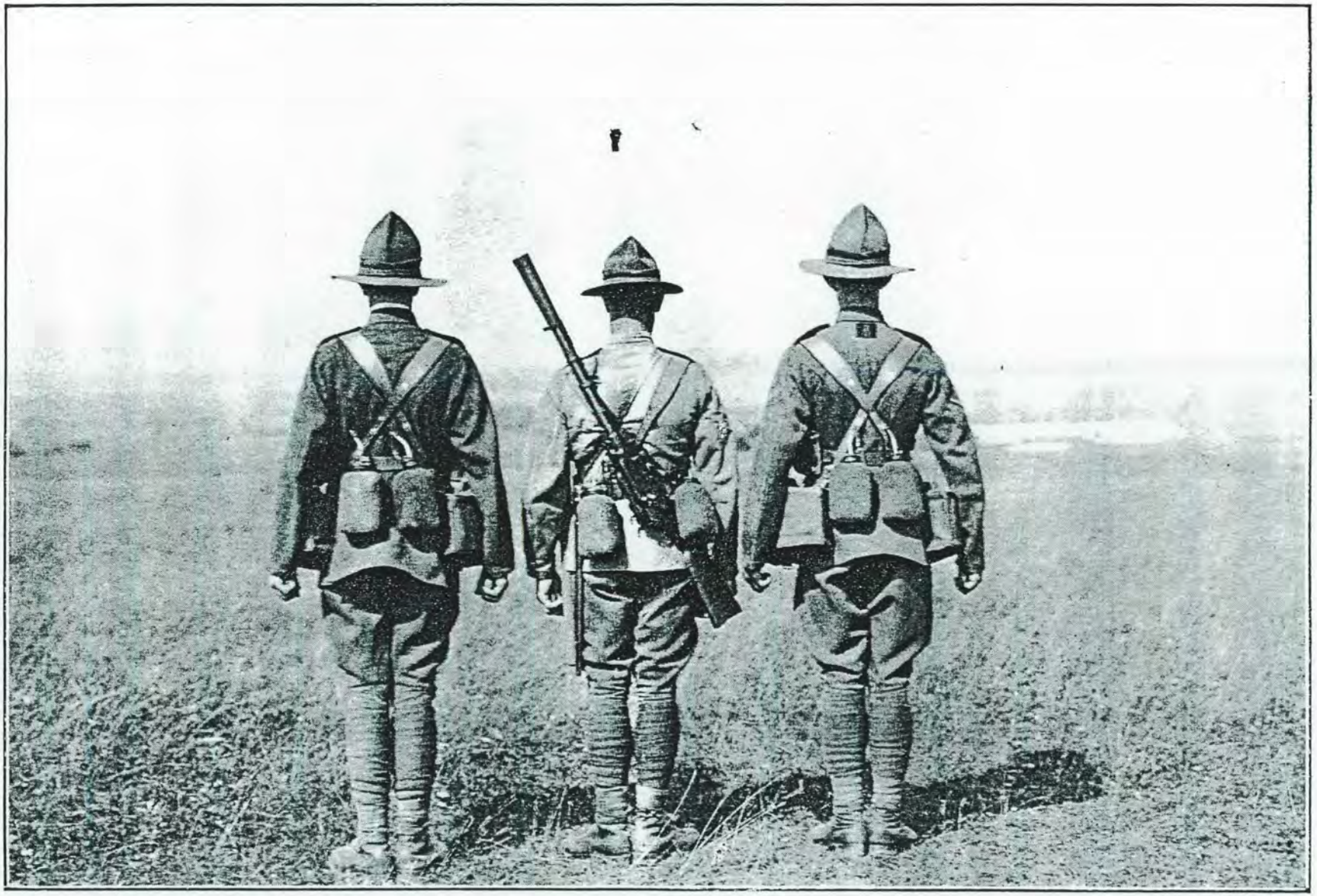
The Hotchkiss Gun was used in the United States' Army for several years under the name of the Béné Mercier Machine Rifle. But the gun proved a complete failure during fighting with the Mexicans and was discarded as obsolete before the Great War in Europe. Yet in 1915 or 1916 the very same gun was adopted as the service gun of the British Cavalry *after the Americans and the French had discarped it.*

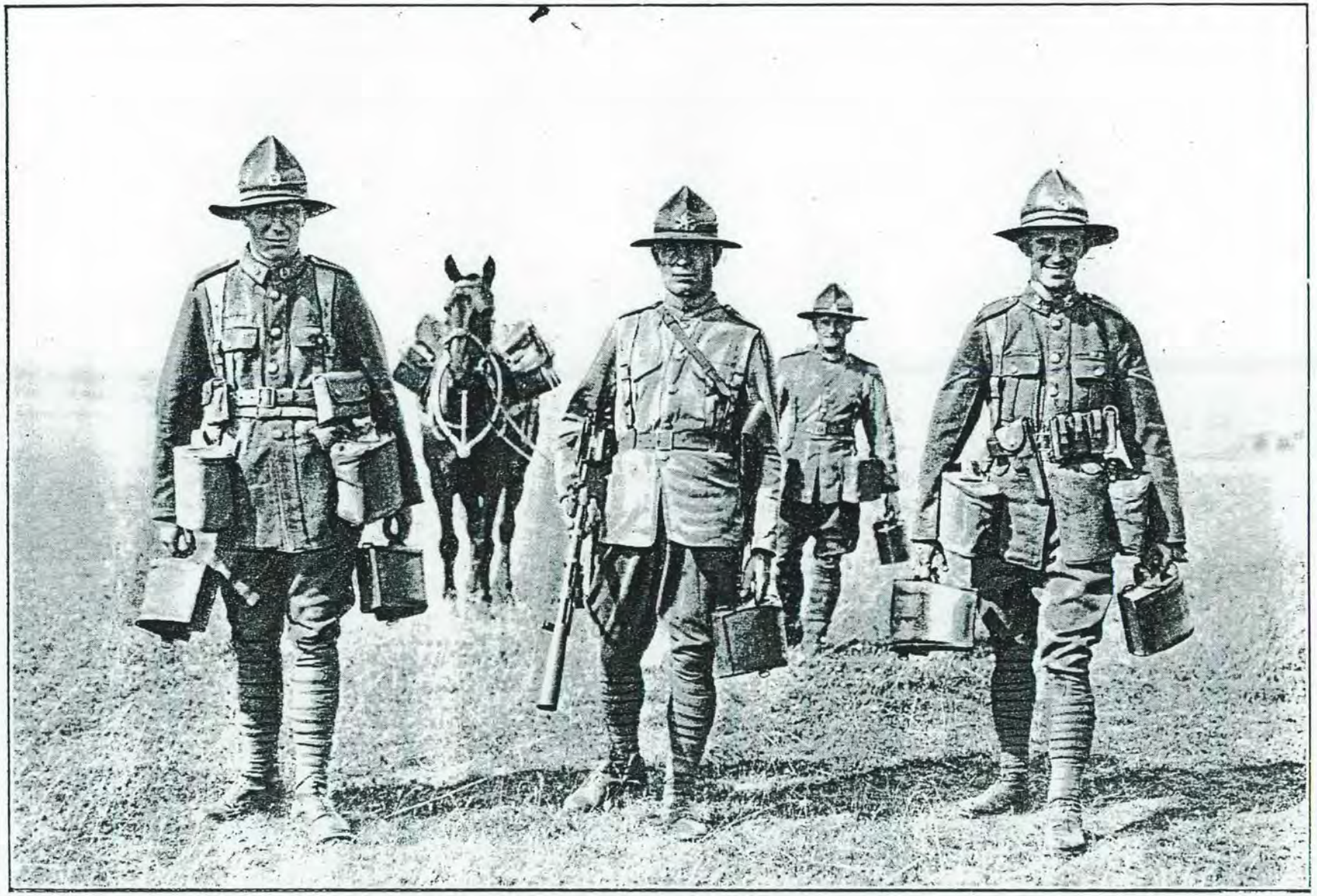
At that time a considerable order for Madsen Guns was placed by the Ministry of Munitions and a big factory built for their production in England and nearing completion. But this manufacture was stopped by order of a certain gentleman in the Ministry of Munition and a new factory built for Hotchkiss guns in spite of the fact that the British Machine Gun School in France and the Naval School of Gunnery at Whale Island had strongly recommended the adoption of the Madsen Gun.

The relative merits of the (adopted) Hotchkiss and the (refused) Madsen gun came to light again in May 1918 during the comparative trials carried out by machine-gun-experts of the British Cavalry. The verdict of these experts is quoted above:

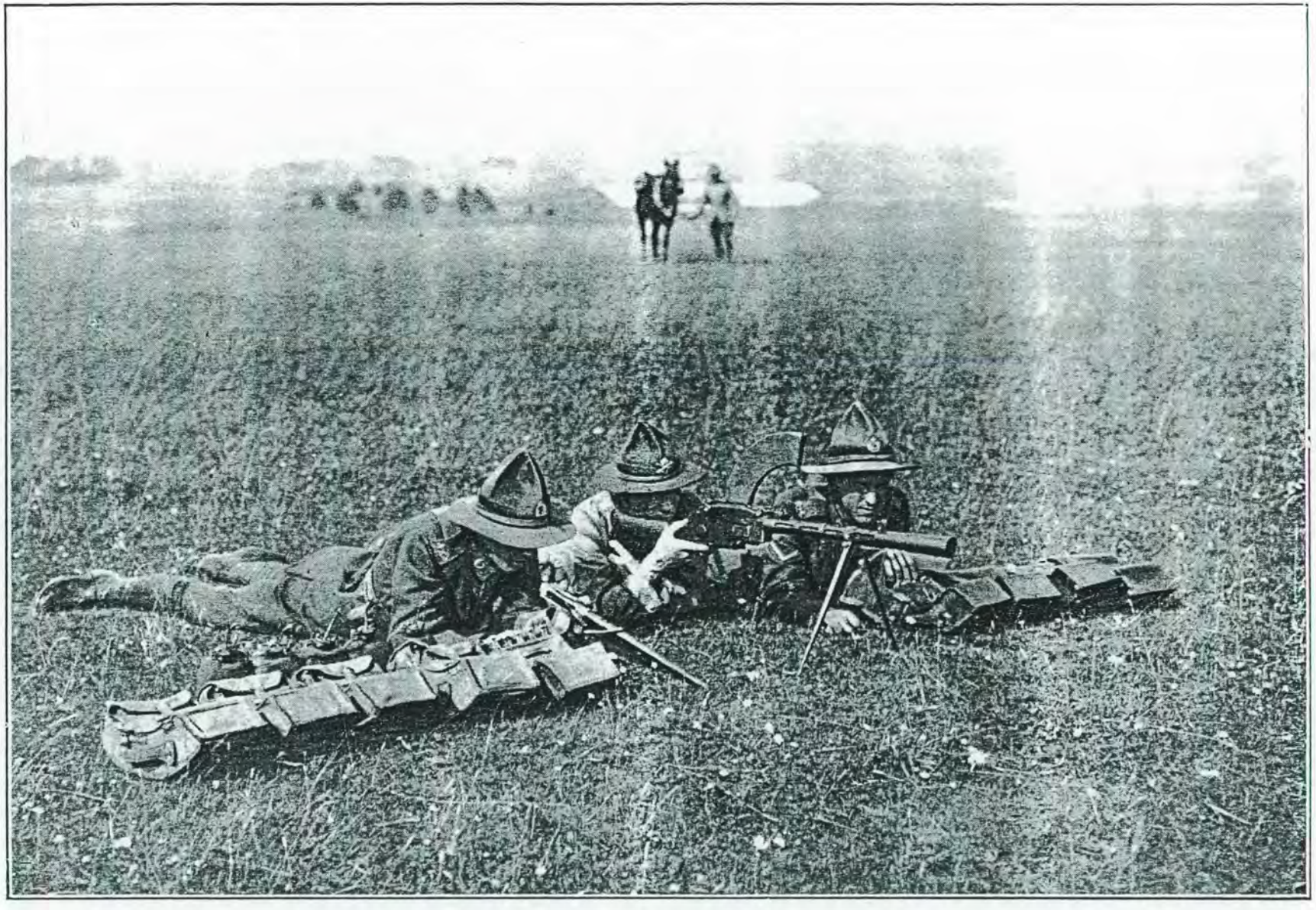
> »*.... We are of opinion that this weapon (the Madsen Machine* »*Rifle) is vastly superior to any light automatic Gun we have* »*yet seen and certainly superior in every way to the Hotchkiss* »*Automatic Gun with which the Cavalry are now armed.*

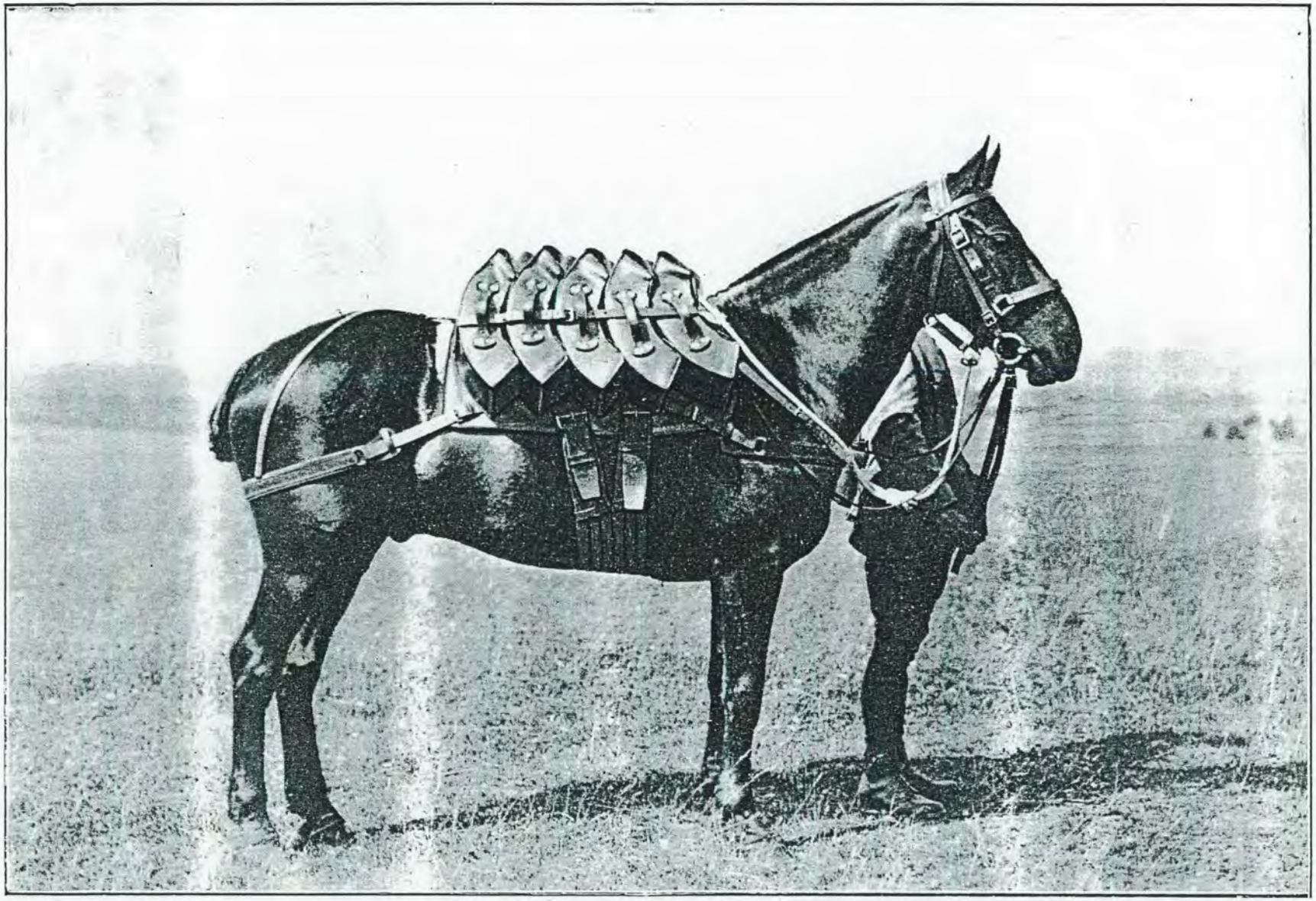


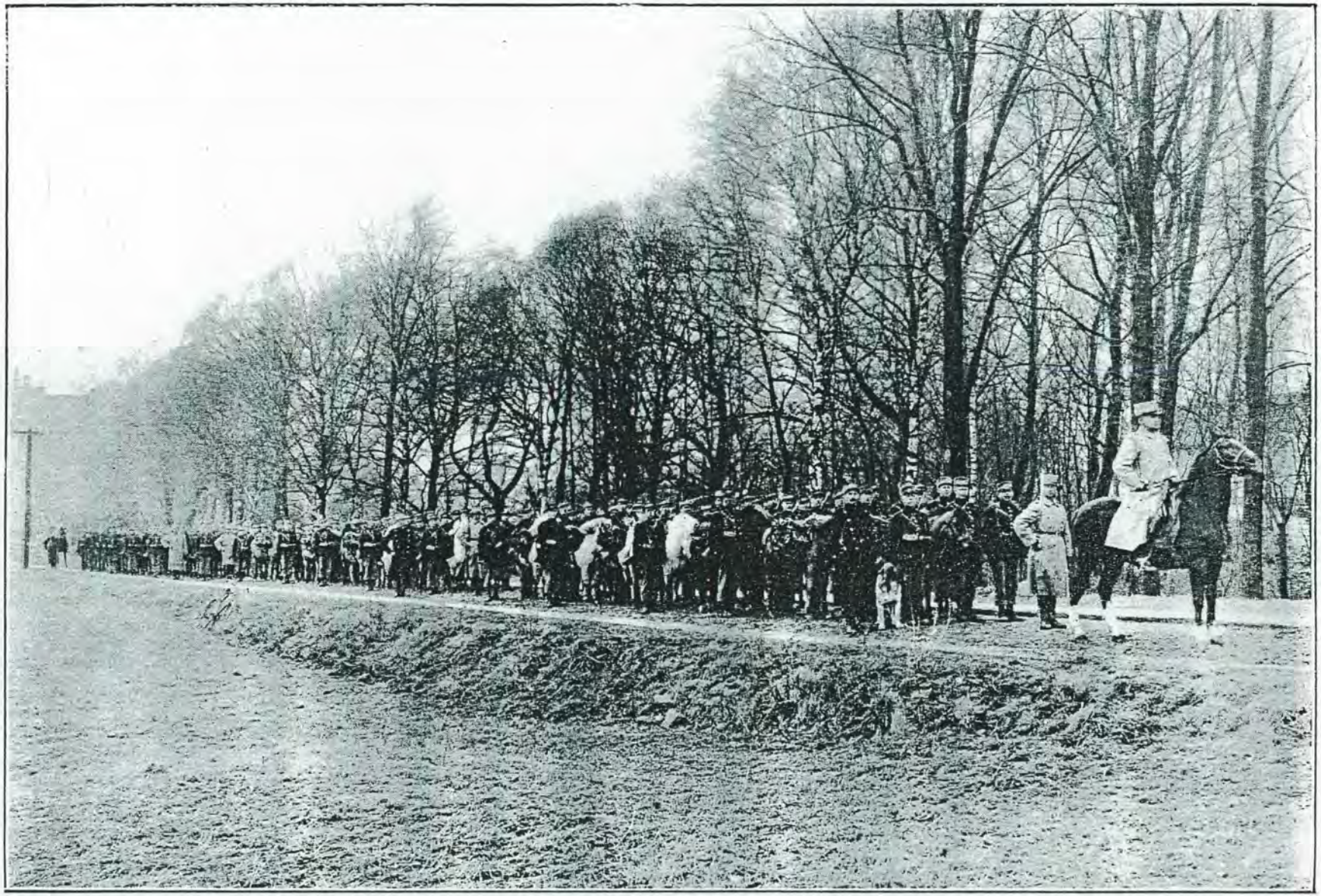




Team advancing carrying 23 wallets with 4600 rounds of ammunition, each wallet containing 5 magazines holding 40 rounds each.







Danish Machine Gun Company with 24 Madsen Guns.

ORGANISATION AND TACTICAL USE

The Madsen Machine Rifle, is used with great advantage by the Infantry, Cavalry, Field Artillery (for defence of the batteries) Supply Columns (on motor lorries) and also by the Navy (for landing parties and light craft). Special Models of the Madsen Gun are designed for use in Aeroplanes and in Tanks.

I
INFANTRY

A COMPLETE TEAM

for one Madsen Machine Rifle with ammunition consists of a Rifleman (No. 1) three Ammunition Carriers (No. 2, 3 & 4). In open warfare a man (No. 5) may be added leading a pack-mule or pony with ammunition. The gun itself is served entirely by one man. The Carriers are armed with powerful, long range, automatic pistols.

FIGHTING POWER.

If these 5 men were armed with 5 ordinary rifles they could fire about 40 rounds per minute on the average. Armed with 1 Madsen Machine Rifle with ammunition they can fire 400 rounds per minute. The fighting power of each such team is therefore *increased ten times,* without in any way diminishing their mobility and independence.

AMMUNITION

is carried in light wallets of leather or web each holding 5 magazines with 200 rounds. It is suggested to have 20 wallets with 100 magazines

holding *4000 rounds for each gun.* Besides, the rifleman carries one magazine (40 rounds), in a holder on the belt, for his own defence in case of emergency.

WHEN ON THE MARCH

the pack mule carries 10 wallets while the other 10 are carried on a caisson or other vehicle or distributed among the gun-team and accompanying infantry.

WHEN IN A DEFENSIVE POSITION

all 20 wallets are kept under cover near the gun.

WHEN ADVANCING TO ATTACK

the wallets are carried forward by the gunteam and by other infantry men. Each man can carry 2 wallets, or 4 wallets for a short distance; all men of the team therefore have a leather-yoke with spring hooks for 2 wallets so as to leave their hands free. In open warfare the pack-mule carrying 2000 rounds will follow the advancing line as near as possible, and is further used to bring back empty magazines and bring up refilled magazines as near as possible to the firing line as cover and circumstances will permit.

Reserve ammunition is brought up in the usual way by supply detachments. *The difficulties involved in the transport of ammunition are obviously the same whatever system of machine-gun is used. With the Madsen-gun however a considerable weight is saved owing to the lightness of the magazines — 45 lbs. on every 100 magazines (4000 rounds).*

EQUIPMENT.

The Rifleman (No. 1):

Machine-Rifle with Bayonet.
Bipod in holder.
2 water bags (for cooling barrel).
Belt and shoulder-straps.
1 magazine (40 rounds) in holder.

Each ammunition Carrier (No. 2, 3, 4 & 5):

Automatic pistol with ammunition.
2 water bags.
Belt and leather-yoke.

No. 2 carries 2 small pouches with spare parts and tools, second barrel-and-breech in cooling sheath, cleaning-rod.

The corporal commanding a section of 2 gun-teams carries:
Automatic pistol with ammunition, 1 small pouch with spare-parts and tools (common for the 2 guns) and 1 pouch with an oil-can.

The Pack-Mule:

Bridle.
Pack-saddle for 10 wallets (50 magazines with 2000 rounds).

INCORPORATION.

No new unit will have o be created: only a certain number of Infantry Sections should be re-armed as above mentioned, and thus converted into machine rifle Sections, each Section (8 men) forming complete teams for 2 Madsen Machine Rifles with ammunition.

AS AN EXAMPLE,

it is suggested to provide:

Each Infantry Platoon with 2 Machine Rifle Sections (4 M. R's and 16 men) which could either remain so distributed, or

Each Infantry Company could unite its 8 M. R. Sections forming 1 *Machine Rifle Platoon* (16 M. R's and 64 men)

Each Infantry Battalion could again unite its 4 M. R. Platoons forming 1 *Machine Rifle Company* (64 M. R's and 256 men)

Each Infantry Brigade could again unite its 4 M. R. Companies forming 1 *Machine Rifle Battalion* (256 M. R's and 1.024 men).

In this way the commanders of Brigades, Battalions and Companies could conveniently concentrate or distribute their Machine Rifles as the tactical situation may require, without splitting up any of the regular Machine Rifle Units.

Such Machine Rilfe Units are as mobile as ordinary Infantry; they

can advance by rushes at top speed, clear obstacles on their way, take up positions everywhere and instantly open fire. The fact that the Madsen Gun *can be fired without support in standing position* enables the Machine Rifle Units to fight under conditions where heavy machine guns are useless: in close quarter fighting, on flooded, marshy or broken up ground when fording rivers, when penetrating into buildings and ruins or into the ennemy's trenches and dugouts. Further, the Machine Rifle Units can carry out storming assaults, using the Madsen Guns with their bayonets for the final hand-to-hand struggle.

TACTICAL USE.

The Madsen Machine Rifle should be used in accordance with its particular characteristics viz:

(1) Its firing efficiency and endurance, almost equal to that of the Vickers Gun (76 lbs.) concentrated in a weapon weighing 16 lbs., and so well belanced that it can be fired from the shoulder without support and used with bayonet almost as easily as a rifle.

(2) Its portability and handiness even when the barrel is hot, its mechanism and casing remaining cold.

(3) The rapidity (12 seconds) and ease with which the barrel is changed in any position of the rifleman and even when he is running.

(4) Its ability to keep up continuous rapid firing for an unlimited time — 400 rounds per minute and up to 12.000 rounds per hour, including the time for barrel changing between the series.

(5) The simplicity and perfect working of its mechanism in spite of mud, water, sand, etc.

(6) No adjustment of the return spring nor cleaning and oiling of any part when the gun is in action.

(7) The remarkable strength of the gun and magazines that enables them to stand the roughest handling on the battlefield.

(8) Lighter magazines than the Lewis Magazines: 113 lbs. saved on the magazines for 10.000 rounds.

The Madsen Guns, therefore, will enormously increase the fighting strength of all Infantry Units, not only for defence, but particularly for attack.

In the Offensive, the Madsen Machine Rifles should be used concentrated in great number in the first attacking wave, and on the flanks of the attacking Units *enabling the Infantry to maintain the superioty of fire with their own arms from the critical moment when the artillery can no longer support them by overhead fire.* They should be followed by other waves of Bombers, Riflemen and »Moppers-Up«.

Every attacking Brigade can concentrate its 4 Machine-Rifle Companies in the front line, with their 256 Madsen Guns deployed on a front of some 1.000 yards width. These can develop a fire of some 100.000 rounds per minute, with overwhelming effect, against the enemy's trenches and their supports and against the counter-attacking reserves.

In this way, the Infantry will be able to break through one line after another, and penetrate deep into the Enemy's defensive area, the Machine-Rifles breaking their organised resistance, the succeeding waves bringing up fresh ammunition, the Bombers and »Moppers Up« clearing the trenches that are passed.

The Machine Rifle Units are also admirably suited for the capture of fortified villages and for holding newly won positions until stronger reinforcements of Infantry and Artillery can be brought up.

No other Machine Gun can rival the Madsen Machine Rifle *in the Attack*, because this gun alone combines lightness and handiness with a tremendous firing efficiency and perfect working under severe battlefield conditions.

The Machine-guns now in use with the British Infantry and Cavalry do not combine these qualities. *The Vickers Gun* is capable of keeping up continuous rapid fire but its weight with the indispensable mounting is 76 lbs. and so it is *too heavy* to be brought over the top and rushed forward with the attacking Infantry. It can only fire from its mounting and is useless in a hand-to-hand struggle.

The Lewis and Hotchkiss Guns possess neither of these essential qualities. They are comparatively heavy (28 lbs. i. e. nearly double the weight of the Madsen Gun) and very difficult to handle after firing, the *entire* gun being overheated. They can keep up rapid fire only for a few minutes with long intermittent pauses to cool down. Their automatic working is bad and unreliable under severe battlefield conditions. They are useless in a hand-to-hand struggle.

Even the Lewis Gun Company admits these shortcomings of the Lewis Gun. In their published booklet: »Lewis Automatic Machine Guns, the Vital Factor in the European War« (6th page), it is said:

> »*In the early days the characteristics of the gun were not* »*thoroughly understood by us, with the result that the gun was*

»*submitted to tests which it has never been intended to with-*
»*stand. For instance, it was fired c o n t i n o u s l y until it became*
»*red hot and jammed,*

and further in the »Instruktion on the Lewis Automatic Gun« page 64:

»*The gun is suited only for short bursts of rapid fire and*
»*should only be used when an excellent target is offered.*

In the Defensiv the Madsen Machine Rifles possess the advantage of paramount importance — *that each gun keep up continuous rapid fire for an unlimited time at the rate of 12.000 rounds per hour,* so that a defensive position held by a great number of Madsen Machine Rifles (there can be one for every yard) cannot be broken or taken by any Infantry attack, however long the onrush continues and however dense the attacking masses may be.

Such attacks could only succeed against positions held by Lewis and Hotchkiss guns and ordinary rifles, which weapons after a few minutes, reach their limits of fire and fall out of action.

In defence also the lightness and handiness of the Madsen Gun is of great importance, because the Infantry may be called upon to change position or to counter-attack or retire at any moment.

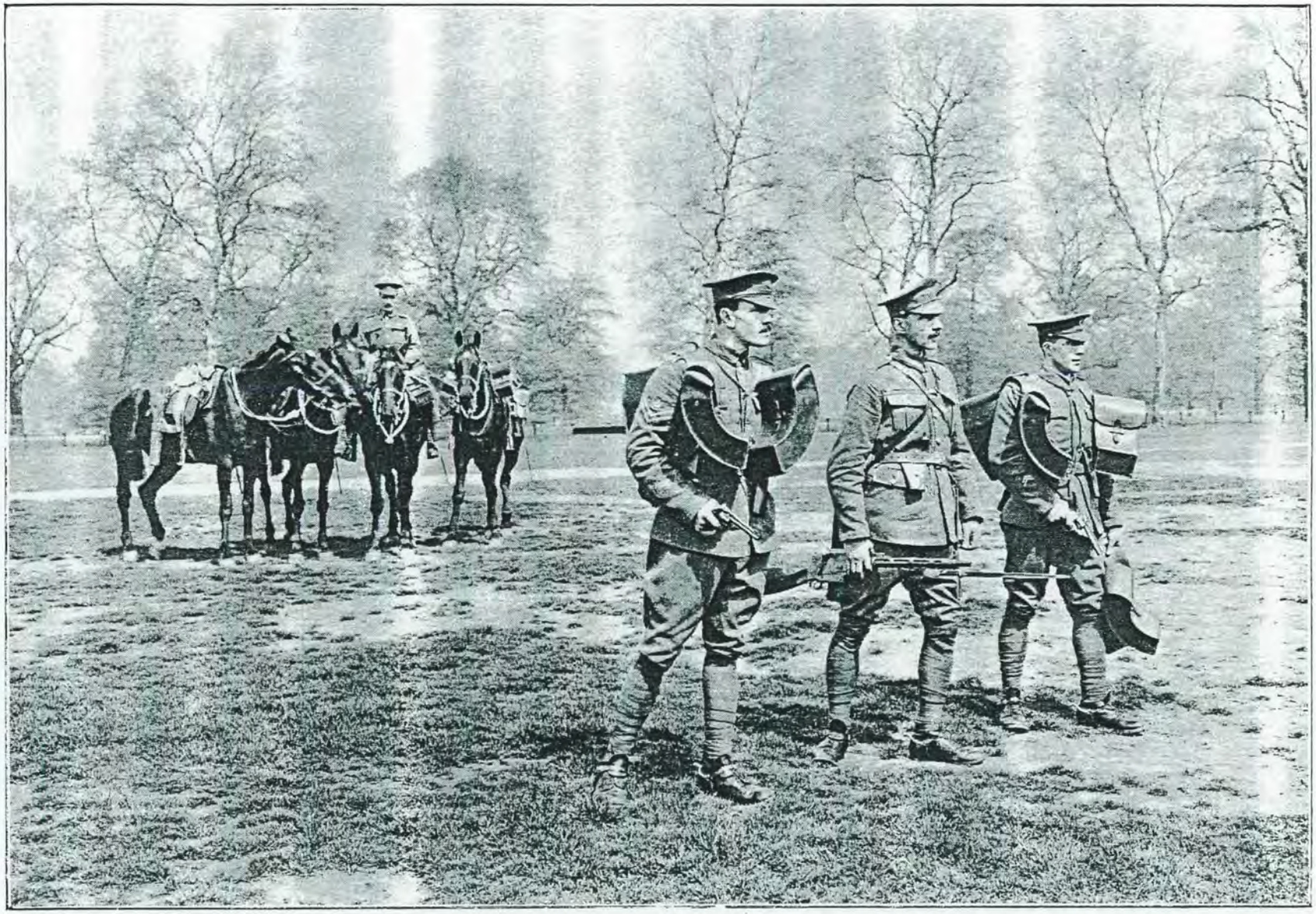
During the preceding Artillery bombardment, the Madsen Guns can be held under cover in dug-outs, etc. and yet be thrown on to the parapet as quickly as ordinary rifles, however demolished the parapet may be.

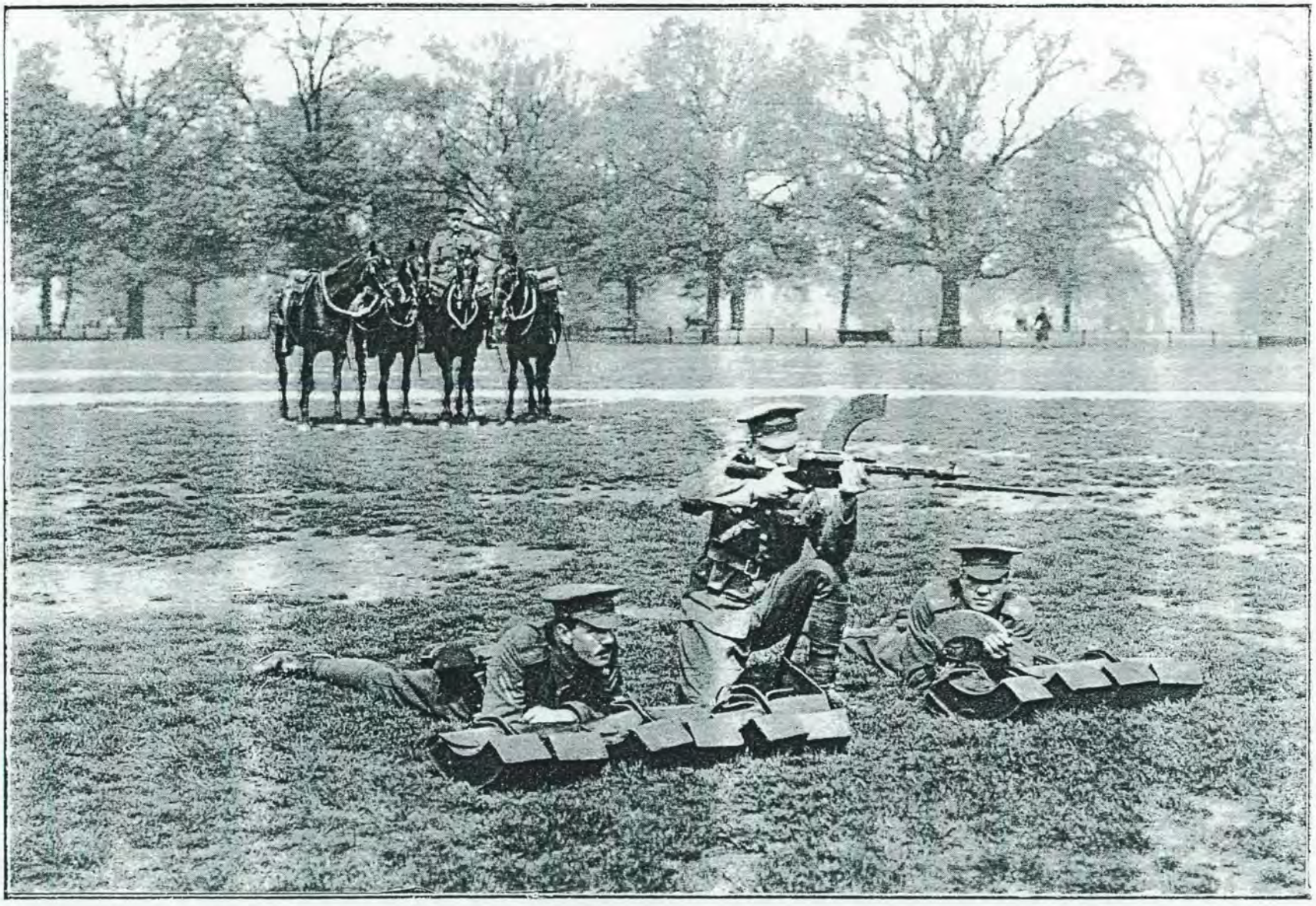
The Vickers Gun is an admirable weapon for maintaining sustained fire from a *defensive position,* but it is too heavy to be instantly brought into action if it were held under cover during the bombardment, and must frequently be abandoned in retreat.

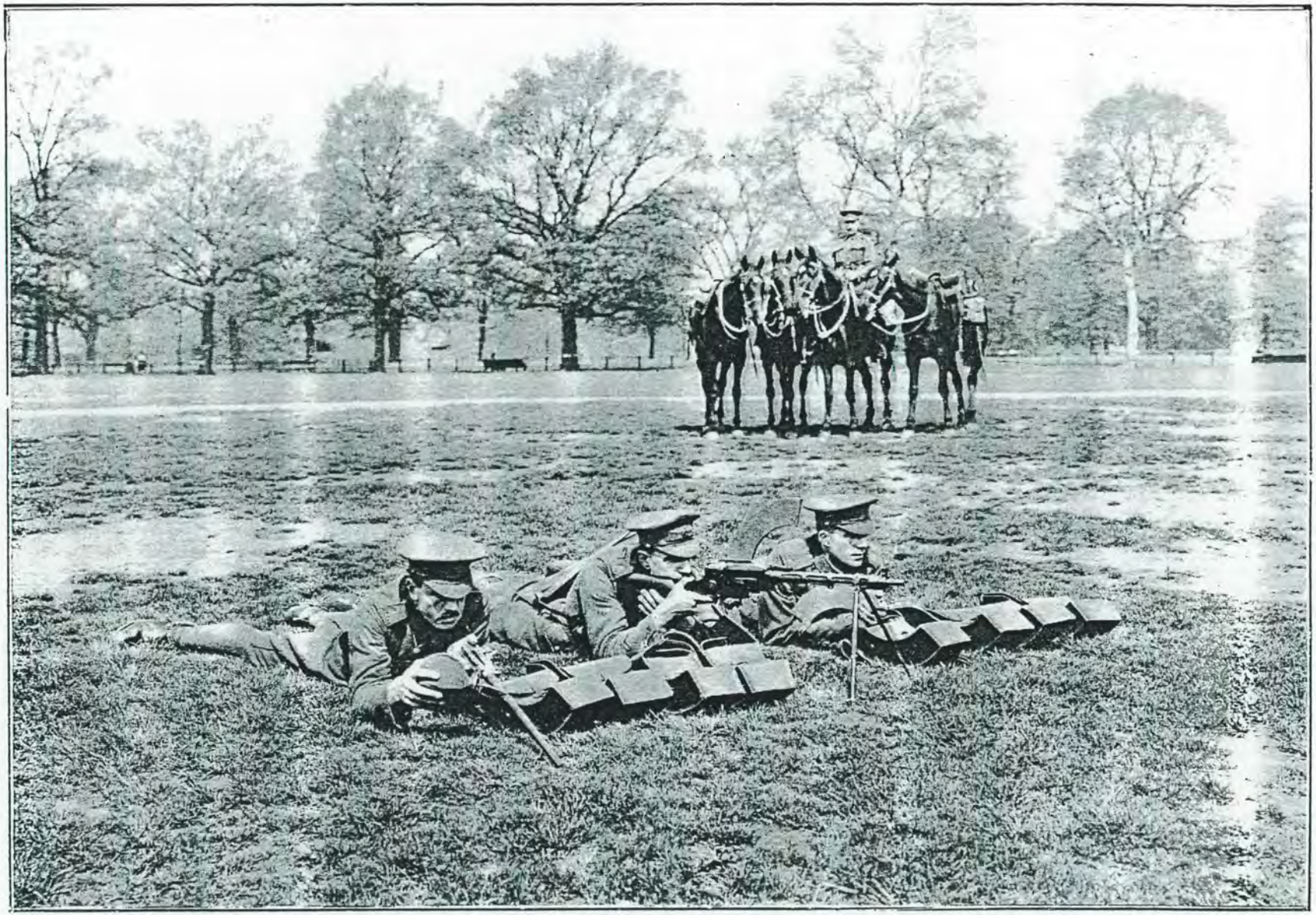
Should the enemy penetrate into our defensive system, then the light, *short* and handy Madsen Gun is an admirable weapon for fighting *in the trenches,* round traverses, barricades and dug-outs to prevent the enemy's further progress.

II
CAVALRY

For the Cavalry, the Madsen Machine Rifle is the ideal weapon because it increases tremendously their fighting power without impeding mobility and independence. The great superiority of the Madsen







M. R. over the Hotchkiss Gun is explained in detail in the first part of this booklet.

With the Cavalry, *every fifth* man could be armed with the Madsen Machine Rifle, which is carried in a leather bucket at the saddle like an ordinary rifle, counter-balanced by the kit-bag. The Madsen gun is only 6 lbs. heavier than an ordinary rifle.

When mounted, the trooper can charge with sword or lance and perform all other cavalry duty as usual.

A CAVALRY SECTION

when dismounted for action, will form a complete team for 2 Madsen M. R. with ammunition, viz: 1 Rifleman (No. 1), 2 Ammunition Carriers (No. 2 and 3), 1 Horse Holder (No. 4) and a trooper (No. 5) leading a pack-horse with ammunition.

When mounted, the Section will act as ordinary Cavalry.

EQUIPMENT.

No. 1, 2, 3 & 4 are armed with sword or lance, No. 2, 3, 4 & 5 with powerful long-range automatic pistols. Otherwise, the equipment is the same as for Infantry Machine Rifle Teams (see page 21), but carried as shown on the photographs.

AMMUNITION

is kept in pairs of wallets carried on the saddles like holsters. Kit is carried in a pair of bags at the rear of the saddle.

No. 1 carries a pair of small wallets containing 4 magazines and one magazine in a holder on the belt. No. 2, 3, 4 & 5 carry each a pair of wallets with 10 magazines. The corporal commanding the section carries also a pair of wallets with 10 magazines viz: 5 for each of his 2 guns. The pack-horse carries 5 pair of wallets each holding 10 magazines.

There is accordingly *for each Madsen Gun, in the first line:*

Corporal,	5	magazines	with	200 rounds
No. 1,	5	—	»	200 —
No. 2,	10	—	»	400 —
No. 3,	10	—	»	400 —
No. 4,	10	—	»	400 —
No. 5,	10	—	»	400 —
Pack-Horse,	50	—	»	2000 —
Total,	100	magazines	with	4000 rounds

Reserve ammunition is carried, as usual, on caissons and waggons with the supply columns.

MOBILITY.

Cavalry armed with Madsen Machine Rifles are as mobile as Cavalry armed with ordinary Rifles. In spite of its lightness, the Madsen Machine Rifle is as powerful a weapon as the heavy tripod-mounted Vickers Gun, and infinitely more powerful than the Hotchkiss Gun which guns both require special pack-horses with horse-leaders for transport.

ORGANISATION.

A Regiment of 4 Squadrons of 4 Troops of 4 Sections would have $4 \times 4 \times 4 \times 2 = 128$ Machine Rifles, with 512.000 rounds in magazines for immediate use in the first line, plus reserve ammunition. No special Machine-Gun Section or Machine Gun Squadron would be required, and the entire Cavalry organisation would therefore be simplified and uniform, the Cavalry being armed throughout with *one fire-arm,* the Madsen Machine Rifle instead of three viz. the Vickers, the Hotchkiss and the Service Rifle, each of which requires different instruction and training, and must have its ammunition loaded in its own particular way (Vicker-Belt, Hotchkiss-Strip and Rifle-Clip) thus complicating the ammunition supply.

FIGHTING POWER.

Every Cavalry Unit would thus obtain an enormous increase in its fighting power for dismounted action. In open warfare, even the smallest Cavalry Patrol would dispose of a machine-rifle with ammunition and would therefore, if compelled to fight on foot, be able to dislodge the enemy's patrols or outposts of Cavalry or Infantry. This would enable them to seize points of advantage for scouting or to hold such points for the succeding troops.

One Squadron armed with rifles can now, when dismounted bring 96 ordinary rifles into action, firing about *1.000 rounds per minute. One Squadron armed with Machine Rifles* as above suggested could bring 32 Madsen Guns into action, *firing 12.800 rounds per minute.* To equal this, entire Cavalry Brigade (3 regiments) would have to dismount for action. Even if one Squadron were used to bring up fresh ammunition for another fighting Squadron immense efficiency and tactical superiority would be gained.

As the Cavalry are now armed they are unable to play any decisive part in the battle of to-day in spite of all gallantry. True, their horses enable them to arrive quickly where their presence is required. But once on the spot the Cavalry lacks the necessary fighting power to conquer.

With the present armament a Cavalry Regiment cannot put more than about 300 rifles in the firing line together with a few heavy cumbersome Hotchkiss guns which quickly fall out of action owing to overheating and choking or owing to mud, dust, water, burnt oil, brass fillings, bent strips, etc., (see the Official British Cavalry Report comparing the Madsen and the Hotchkiss). The fighting power of the Regiment therefore is reduced to equal that of an Infantry Company and this is out of proportion to the cost for upkeep of Cavalry.

The introduction of the Madsen gun would open up new possibilites for the Cavalry.

A dismounted Cavalry Regiment could then bring into action 128 Madsen guns firing 50.000 rounds in any given minute. This is equal to the fire that 5 Infantry Battalions armed with rifles could develop, and it should be remembered that the Madsen guns are capable of keeping up this violent fire as long as may be required. They never fall out of action.

TACTICAL USE.

It is obvious that with such a tremendous fighting power added to

its mobility and dash, the Cavalry will again, under the changed conditions of modern warfare, become an Arm of the greatest importance, constituting a highly mobile and powerful reserve to be brought up quickly for attack or defence in critical situations. It may for instance be urgent to hold a newly-won position until reinforcements of Infantry and Artillery are brought up; or if a local defeat has been inflicted on our troops, it may prevent a disaster when a Cavalry Brigade armed with Madsen Rifles is hurried to the spot in time.

Generally speaking, the tactical use of Madsen guns with dismounted Cavalry, is the same as for Infantry (as set forth on page 23 and following).

EXPERT OPINION.

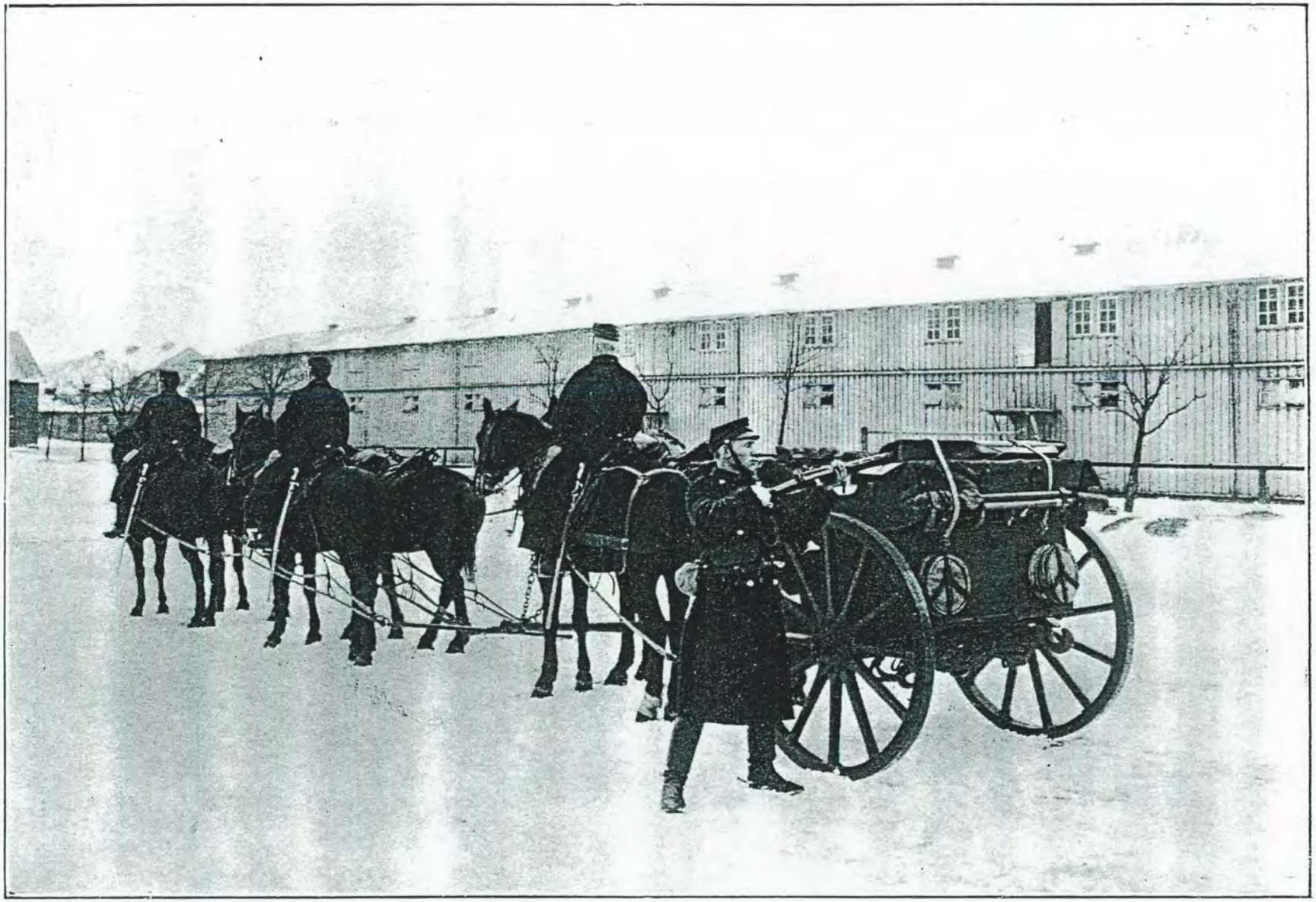
The Madsen gun was submitted to prolonged trials with the British Cavalry in the Spring of 1918 and a detailed official report was drawn up ending with the following general conclusions:

»From a Cavalry point of view, from what has been seen »during the past few weeks of the Madsen Rifle both on the »range and from practical experience gained, we are of opinion »that this weapon is vastly superior to any light automatic gun »we have yet seen, and certainly superior in every way to the »Hotchkiss Automatic Gun with which the Cavalry are now armed.

»Its possibilities in open warfare are most pronounced owing »to its lightness and easy handling, whether it be in attack or »defence.

»With a weapon almost as easily used as a rifle, and with its »simplicity and apparent reliability, the Cavalry would have an »extremely powerful and concentrated fighting force without »losing its mobility, unhampered in the use of his force by the »difficulties of unnecessary pack-horses, able on all occasions to »bring this remarkable weapon to bear in the shortest possible »time, able dismounted to put out a large belt of reliable con- »centrated fire, most useful in the holding of a position recently »occupied, and, at close quarters, an effective weapon for which »a suitable bayonet attachment is provided.

»In our opinion the possibilities of this weapon from a purely »Cavalry point of view are infinitely superior to those of the »Hotchkiss.



III

FIELD ARTILLERY

The Madsen Machine Rifle may be used with great advantage for the defence of field batteries whether on the march or in position against sudden attacks by hostile troops or air-craft. Each battery should be provided with a sufficient number of these rifles (for instance 8) to defend all echelons of the battery in position, viz: the gun line, the isolated limbers and teams, the reserve wagons and teams, and the fire-control station. For this purpose, four of the machine rifles should be carried on the wagon bodies, two on the limbers and two on horse-backs.

The Madsen Machine Rifle can easily be served in case of attack by the artillerymen who otherwise serve the wagons or limbers. In this way, the Field Artillery will be more effectively defended and will no longer need escorts of Cavalry or covering detachments of Infantry for protection.

IV

WITH THE NAVY

The Madsen Machine Rifle is admirably suited for *Landing parties* which might be exclusively armed with these weapons. Warships can only land comparatively few men whilst their task may be of great importance. It is, therefore, essential that the Landing parties should possess the greatest possible fighting power. What is said above for the Infantry equally well applies to Marine Infantry or Landing Parties of Sailors who could derive the same advantages from these light and powerful weapons.

Further Madsen Machine Rifles may be successfully used as an auxiliary armament for destroyers, patrol-boats, submarines, mine-sweepers and other light craft, for river-expeditions and for *Anti-Aircraft Service.*

V

WITH THE TANK-CORPS

The Danish Recoil Rifle Syndicate have designed a special British TANK-MODEL of their Madsen Machine Gun, designed as the other

British models, to fire the British service-rifle-ammunition, bore ·303. The Tank Model is provided with trunnions in the barrel-axis line, armoured bullet-proof barrel-cover, special Tank-sight, and a short pistol grip instead of the usual rifle-stock. The mechanism is identical with that of the other models of the Madsen gun.

The advantages which this gun offers for use in Tanks are shortly summarized as follows:

1. Perfect automatic working under all conditions. No jamming.
2. Entire absence of breakable parts or parts that get out of order during combat.
3. No oiling, no cleaning, no readjusment of any part.
4. The *entire* mechanism and its casing are located behind the trunnions, *inside* the armoured turret of the tank. Yet this portion is very much *shorter* and smaller than the corresponding portion of the present Tank-gun.
5. Only the barrel with the armoured barrel-cover protrude outside the turret.
6. Extra-heavy barrel enabling the gun to fire long bursts of continuous rapid fire.
7. Barrel with breech is changed in 12 seconds from inside the turret *without* removing the gun itself. Enemy cannot detect when barrel changing is taking place.
8. Gun never out of action except for this interruption of 12 seconds. Otherwise continuous rapid fire (400 rounds per minute) can be kept up for an unlimited time. Also slower single-shots can be fired simple by turning a swivel into the corresponding position.
9. No vibration and no recoil felt.
10. No flash to betray the position of the tank through the smoke-screen.

These caracteristics give the Madsen Tank-Gun a distinct superiority over the Hotchkiss-gun used in the British Tanks during the war.

VI

IN AEROPLANES

The Danish Recoil Rifle Syndicate have designed two special Aeroplane-Models of the Madsen Machine Gun. One model is a »fixed gun« firing through the propeller with a synchronised trigger device. The magazine contains *400 rounds* of British ·303 service ammunition. The barrel is heavy so as to make it withstand a greater number of shots before being worn out; the length of the barrel is such as to give the bullet an initial velocity of 2450 feet per second so that the usual regulation aeroplane-sight may be used without alteration.

The other model is a »moveable gun« provided with trunnions so as to be mounted in a Scarff-Ring or the like. Various models of magazines, smaller than that for the »fixed gun« are in existence.

Otherwise the 2 guns are indentical. They are both provided with an efficient flash-absorber and a special simple device that increases the rapidity of fire.

The advantages which the Royal Air Force would obtain by the use of these 2 Madsen guns are shortly summarized as follows:

1. One and the same system of machine gun — for moveable as well as for »fixed guns«. Therefore: simplified and uniform instruction, simplified supply of spare-parts and maintenance of the guns.
2. Perfect automatic working. Absolute security against jamming.
3. No oiling, no cleaning, no readjustment of any part of the gun.
4. Entire absence of breakable parts or parts that get out of order during action.
5. Exhaust oil from the engine dirt etc. do not affect the perfect working of the gun.
6. Extra-heavy barrel enabling the gun to fire long bursts of rapid fire without being worn out too soon.
7. No flash.
8. Great accuracy.

These two Madsen Aircraft-guns have recently been submitted to exhaustive comparative trials with the Swedish Royal Air Force with the result that they were classified as the best existing aerial machine-guns and adopted as service-weapons. They are also adopted as service guns by the Danish and the Norwegian Royal Air Forces.