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Friday June 21. 1883.

MAJOR-GENERAL EDWARD H. CLIVE, Commandant Staff College,
in the Chair.

FIRE DISCIPLINE AND THE SUPPLY OF AMMUNITION IN THE FIELD AS PROVIDED FOR BY FOREIGN POWERS.

By Captain WALTER H. JAMES, F.G.S.

It is often said that modern war is less deadly than ancient, that the loss of life which a nation suffers in the fighting of to-day is more moderate than that which occurred in olden times. This may be true as regards the general result, but certainly the improvements in modern arms have rendered the losses at the points where collision actually takes place far more deadly than they were with the old weapons. It must not be forgotten that, arduous and difficult as was the fighting in the Franco-German or the Russo-Turkish Wars, the improvements which have since taken place both in small-arms and cannon have enormously increased the power of these weapons. Shrapnel shells have placed a power in the hands of the artillery, the effect of which has as yet been seen in no war fought between civilized nations. The introduction of high explosives has rendered common shells far more destructive and dangerous; while the proposed introduction of really small-bore rifles, having nearly double the range of any arm yet used in war, and the magazine arrangements of which will increase and intensify the power of fire from them, have augmented enormously the power of the infantry rifle. These technical improvements, while men and horses have remained what they were before, have totally changed the face of modern tactics.

The time at my disposal prevents my dealing with the many problems which these changes have given rise to; nor would a discussion on these heads be exactly germane to the subject which I have to-day, at the request of the Council of this Institution, to offer for your consideration; but it is evident that improvements in guns and rifles will lead to a great extension of the zone in which bullet fire is to be dreaded; while the introduction of high explosives, and thereby the increased power of the bursting charges of shells, will produce enormous moral effect both by their effect on human beings and by the wide-spread and rapid destruction which they will cause in buildings and other erections.

To meet these new conditions of warfare, troops will have to take up formations which themselves offer as little target as possible to the mass of projectiles hurled against them, at distances hitherto almost undreamt of, and which hardly any European Army seems yet sufficiently to have taken into account in its formations.

These considerations, based on the effects produced by modern arms, all point in one direction, viz., the absolute necessity of practising the men in peace-time in the use of their weapons, so that they shall be able to obtain the best possible effects from them in war. They point, therefore, to simplification of the mechanical parts of a soldier's training, so that as little time as need be shall be given to drill, and as much as possible to field-instruction. Drill—while as necessary, nay, perhaps more necessary than ever to ensure discipline and absolute reliance on leadership—will not take the place of instruction which must teach the soldier what to do in the ever-varying phases of a modern combat. The distances he has to advance over now, not in the close formation in which he had but to obey the voice of his leader, but in open order in which, while equally obedient, he must be more self-reliant, and the enormously destructive character of the fire which he has to go through, plainly show that only in the daily peace practice of what he is called upon to do in war, can be found an adequate solution of the problem. The modern soldier is becoming every day more like the ancient Roman legionary, that is to say, he must keep himself in proper fighting condition by the habitual practice of the task required of him.

In no army in Europe has this principle been more fully recognized than in the Prussian. The drill formations have been few and simple; and yet almost the first military utterance of the late Emperor¹ was one in which he foreshadowed the early introduction of still simpler forms. What is the main business of the infantry soldier? To shoot straight. Hence he must be trained to bring up his shooting capacity to the very highest point possible, and the systems of infantry attack and defence must be designed with a view to this end. The proper control of the soldier when in action; the regulation of his fire, so that it shall be effectually and properly directed to the object of the fight, not thrown away without adequate result; and the keeping up and maintaining of an adequate supply of ammunition for these purposes, these two objects are only to be gained by an adequate system of fire discipline and of ammunition supply, which thus form the two main points to be considered in modern infantry fighting.

The Prussian Regulations.

The Prussian Regulations divide infantry ranges into three classes, viz., *Close ranges*, under 400 metres, say 450 yards; *Moderate ranges*, between 450 and 900 yards; and *Long ranges*, above 900 yards. At distances exceeding the last-named, an adequate result is only to be

¹ The new Prussian Field Exercise has been published to-day, 15th September, 1888.

obtained by a considerable expenditure of ammunition, and only objects therefore should be fired at whose height, length, and breadth offer favourable targets. Two different sights are to be employed as a rule for distances over 600 metres (660 yards), unless the range is accurately known, when one only is to be used. But this division of sights is not to take place unless the body of men using them is of the strength of a *zug*, i.e., one-third of a company, or about 60 to 80 men. Above 450 yards, the bottom of the target should be aimed at.

It is recommended for facility of control over the fire, that the different sections forming the fighting line be kept in as close formation as the enemy's fire permits, and with distinct spaces between them. Ranges should be carefully ascertained from maps, or from infantry and artillery already in action. If the ground in front of the target permit the effect of the projectiles to be seen, ranges may be ascertained by volleys. The *zug* leader is recommended to keep near him two or three good judges of distance, who should estimate the range of the various objects to be fired at.

On the defensive, ranges should be marked out by objects which are clearly visible to the defender but not to the assailant. The choice of a target will depend first of all on tactical considerations; secondly, on the probability of a good result from the fire. The range should not be often altered, because to do so, leads to waste of fire. Before opening fire it must be remembered that the amount of ammunition carried is limited, and that it should only be expended where an adequate return may be expected. But once it has been determined to open fire, a sufficient number of rounds should be expended to attain the required result.

The rapidity of fire must depend on the object of the fight, the form of target, and the ammunition available. A quick rate should only be used at close ranges, but against artillery a rapid fire may be employed at distances over 900 yards.

The kinds of fire recognized are—*volley*, *independent*, and *magazine fire*.

Volley firing, whether from an extended or closed line, has the advantage of keeping the troops better in hand, and allowing the effect of the fire to be better observed. But as the voice cannot be heard in the noise of the fight except with difficulty by a *zug* in close order, and still less by one in open order, volley firing must perforce be confined to the commencement of the fight, and to moments when troops are not under effective fire.

Independent fire is considered as probably more efficient, because the men can select the moment to fire, and can aim undisturbedly. The men are to be taught to depend for results, not on the number of shots fired, but on their being well aimed. The rapidity of fire will be indicated by the words "quick" (*lebhaft*) or "slow fire." (*langsam*). If the command to lessen the rapidity be not attended to, the fire should be stopped altogether, and then again commenced. In addition to these two kinds of fire, a distinction is also made between independent fire in accordance with orders, and independent fire left wholly to the judgment of the men.

Magazine fire is, as a rule, only to be used at close ranges, and at decisive moments such as the time immediately preceding the assault on a position, or, on the defensive, to beat back such an assault. It will also be used to defeat cavalry, and on occasions when an enemy is suddenly encountered. The men must be carefully practised only to use the magazine at moments such as these, or when a pressing need demands it. The use of magazine fire at ranges between 330 yards and 900 yards, *i.e.*, beyond those reached by the flap sight,¹ is only to be made use of against objects of sufficient surface exposed to fire only for a short time.

The direction of fire on a given object is one of the most difficult tasks of an infantry leader, which is only to be attained by an accurate indication of the object and accurate orders. The word of command must be short, and must give, first of all, the direction, next the object, then the sight, and, lastly, the nature of the fire. For example, "At the artillery on the green hill, sights for 900 and 1,000 yards, quick independent firing;"

Or "Straight to front, at the lying-down skirmishers, 500 yards sight, independent firing;"

Or "At the cavalry by the white house, flap sight, magazine fire;"

Or "Magazine—Present—Fire—Load."

Firing will be stopped at the word "Cease fire," or by the group-leaders whistling. The whistle is an attention signal, and the men must at once cease firing or loading, and wait attentively for the next command, as, for example, to change the direction of fire, to alter one of the sights employed, or to aim differently.

It is necessary to observe continually the effect of the fire by means of field-glasses, and to judge from the fall of the bullets, or the appearance of the enemy, whether the point aimed at is struck and the sighting correct. The leaders of the firing line should, if possible, take up such a position, having regard to the direction of the wind, as will enable them to observe the effects of the fire. If the smoke prevent them doing this, special observers should be stationed under cover on a flank to note the effect, and communicate the same to the leaders of the firing line by means of signals previously agreed on, by shouting, or by means of connecting links.

It is impossible to define absolutely the duties of the various ranks, but generally they are as follows:—

The battalion commander and superior Officers define the direction of attack, and in general terms the object to be aimed at, but only exceptionally can they be in a position to determine when fire should be opened. It is their duty to see that a fresh supply of ammunition is sent forward at the proper time.

The company leader orders the positions of the *süße*, judges the distances, orders, as a rule, the commencement of fire, and defines as long as he is able the point to be fired at. He regulates the movements of the men, observes the enemy and the effect of his men's

¹ 300 metres (330 yards) is the range for which the flap sight is used. The standing sight gives a range of 200 metres, or 220 yards.

fire, ensures the replacement of ammunition with the means available on the battle-field, and sees to the distribution of that brought up from the rear.

The *zug* leader sees that the *zug* takes up a proper position, and defines the object to be aimed at, in accordance with the direction of the company leader, or when in the course of the fight this becomes impossible on his own responsibility. He orders the sight to be employed, the commencement and nature of the fire, from what pouch the ammunition shall be taken, observes the effect of the fire, and orders it to cease if need be. He takes care, as long as he can control it, that the expenditure of ammunition should be slow and in proportion to the object to be gained. He observes the enemy and endeavours to act as much as possible in unison with the other *züge* in the firing line.

The group leader¹ is responsible that his group takes up the position ordered. He watches the sighting, the amount of ammunition employed, and the effect it produces, and sees that the men keep their magazines full. He passes on the commands of the *zug* leader to the neighbouring groups when necessary, and blows his whistle as soon as the *zug* leader uses his.

Fire discipline embraces a careful carrying out of the orders given during the combat, as well as a most careful observation of the manipulation of the weapons, and of the instructions laid down for conduct when fighting. It requires calm behaviour under the enemy's fire even when unable to return it, careful delivery of fire and use of the ground so as to increase the effect as much as possible, and constant observation of the enemy and of the leader. Fire must cease as soon as the target becomes invisible, or the leader orders "cease fire" by the whistle or otherwise.

Fire discipline must be so engrained into the men as to maintain its influence, even when owing to the conditions of the fight the leaders can no longer enforce it, and only the superiority of individuals or the example of especially brave and active men takes effect on the others. To rouse this spirit of self-reliance the men must be practised in the conditions in which leadership is no longer possible, and taught how to conduct themselves in them. As a general rule, they should understand when left to their own resources that they may (not must) only fire at high and wide objects at ranges between 450 and 900 yards; that at ranges over 900 yards they should not as a rule fire at all; but that at ranges under 450 yards they may fire at any object.

The French Regulations.

The French Regulations recognize three divisions in infantry ranges, *Close ranges*, under 450 yards; *Moderate ranges*, 450 to 900 yards; and *Long ranges*, between 900 yards and 1,650 yards.²

Individual infantry soldiers may be fired on up to 330 yards (300 metres), if standing or kneeling. A squad up to 550 yards. A

¹ The Prussian *züge* are divided into sections of not more than 6 nor less than 4 files, i.e., 18 to 12 men. Men of a section form a fire group.

² For later particulars see Appendix.

line of skirmishers may be fired on at ranges varying from 550 to 900 yards, according to its density. Groups of men in close order may be fired at if 5 yards broad up to 900 yards, if 10 yards broad up to 1,100 yards, if 20 yards broad up to 1,300 yards. A section of artillery may be fired on up to 1,300 yards. Company columns, compact bodies of artillery or cavalry may be fired at up to 1,650 yards. Any distance beyond this is to be considered exceptional.

The 300 metre sight is considered the proper one to use for close fighting, as with it the ground is swept up to 350 metres (about 400 yards); against cavalry or men standing the 400 metre sight may be used between distances of 400 to 450 metres. Over this range a more accurate sighting is necessary. The range may be estimated by volleys of which the effect can be observed through glasses. Care should be taken that, to commence with, the elevation should be considerably less than the estimated range. The absence of dust is a clear proof that the range is too long, but dust in front of the target is no proof that it is too short, for in a well-regulated fire half the projectiles will fall behind and half in front.

Men may be stationed to observe the fire on the flank of the men delivering it.

Different sights are only to be used with caution. Against a moving object or one of considerable depth, two sights differing by 100 yards may be used, but not by smaller bodies than sections.

Fire is the preponderating influence in fighting. Its use cannot be left to individual will without danger of the ammunition being squandered and consequently being wanting when most needed. The regulation of fire is the duty of the Officers commanding the companies or their superiors in an early stage of the fight. The different kinds of fire admitted by the French Regulations are *volley*, *skirmishing fire*, *rapid fire*, and *magazine fire*. *Volleys* should be employed as long as possible, but they cannot be made use of except at long ranges, and then by order of the battalion or company commanders, nor, as a rule, by troops advancing to the attack, for they require immobility and an amount of safety from the enemy's projectiles incompatible with a vigorous offensive. *Volleys* may, however, be delivered by bodies told off for the purpose, by the reserves from lateral positions or from high ground. On the defensive they may be made use of up to the moment of the enemy's assault and even during it, since he (the enemy) advances without protection and no longer fires. *Volleys* should not generally be delivered by a larger body than a section, or in certain cases by a half company at ranges over 1,100 yards; at shorter ranges *volleys* may be fired by half-sections or squads.

Skirmishing fire is the usual kind of fire employed at medium ranges. The number of cartridges employed is usually three but is never to be more than four. It is considered to give better shooting results than *volley* firing, but has the disadvantage of letting the men more out of hand and rendering it more difficult to concentrate the fire. It is the fire to be employed generally in passing over the medium distances from the enemy. But a shooting line should not,

as a rule, open fire before 800 to 700 yards from the enemy in open ground, or 450 yards in difficult ground affording cover.

Rapid fire is only to be employed at ranges between 220 and 230 yards, *i.e.*, when the final stage is reached. The men should aim and fire rapidly, using the 300 yards sight.

Magazine fire is, as a general rule, not to be used at ranges over 150 metres, *i.e.*, 165 yards from the enemy, and then only at the word of command. But Officers commanding companies should not hesitate to use it at longer ranges against troops which suddenly appear or which may be visible only for a short time if proper loss can be inflicted on them. When the soldier has been using the magazine he should take the first opportunity to fill it up again.

The range at which fire should be opened depends upon the facilities for regulating the shooting, the nature of the ground, the vulnerability of the target, and its tactical importance. Distant fire may put the enemy in disorder and prevent them coming into action. It may render the occupation of an important point impossible, such as a bridge, a junction of roads, or the mouth of a defile whence the enemy must debouch. But it can rarely have a decisive effect. Its use, therefore, demands a just appreciation of the situation, and cannot be left in the hands of subordinate Officers. As a general rule, the Officers commanding the battalions or companies will determine the object to be fired at, the time to fire, and its duration. It is at close ranges that it is most necessary to have available the largest number of muskets and cartridges, as at these ranges it is that fire is the most powerful and effective. The attack should be prepared at long range by artillery, exceptionally only by infantry. To open fire prematurely serves only to lengthen the struggle and to exhaust the ammunition and the moral force of the troops. On the defensive, however, opportunities will more frequently occur for using long-range fire on targets of large dimensions—chiefly artillery. Such a fire will often have the effect of making the assailant assume prematurely open order and expend an undue amount of ammunition at long ranges.

The power of fire is considerably augmented by concentration, which is more easily obtained at medium ranges than at close ranges when the troops are more out of hand. The Officer commanding the battalion should indicate the objective at the moment the battalion deploys for the attack. The duty of conducting the fire devolves on the Officers commanding companies and those employed in the fighting line. The Captains determine the objects to fire at, the kind of fire to use, and the number of men to put in the fighting line during the preparatory period of the attack. While leaving details to the subordinate Officers they should take care that the men fire in the direction ordered, and endeavour to keep them in hand as long as possible. The section leaders order the sight to be used, the point to be aimed at, the number of cartridges to be employed, and regulate the intensity and duration of the fire.

The leaders of smaller units have to superintend the due carrying out of these orders.

The Austrian Regulations.

The Austrian Regulations divide infantry ranges into three classes—*close ranges* up to about 400 yards, *moderate ranges* between 400 and 850 yards, *long ranges* all over the latter. Firing is, as a rule, only to take place within moderate or close range. The various kinds of fire used by the Austrian infantry are—

1. Volley fire.
2. Marksmen fire.
3. Skirmishing fire.
4. Independent fire.

Volley fire may be used either by formed bodies or by groups (*Schwarme*¹). The groups are to use volleys at moderate ranges and at close ranges as long as possible, especially against large, formed bodies of men. Volley firing should be used always against cavalry, and, as a rule, against artillery.

The skirmishing fire, used as a rule at moderate ranges, is to begin as a rule as marksmen's fire, *i.e.*, the marksmen only firing. At and within 500 yards, under certain circumstances, or at any rate at close ranges, it will be taken up by the whole of the men, *i.e.*, it becomes skirmishing fire. It is considered often desirable to limit the number of rounds to be fired.

Independent fire is only to be used at decisive moments, and the number of cartridges may or may not be defined.

Long-range fire is only to be made use of by closed bodies, and then only when the range can rightly be ascertained, the target clearly seen, and of such a size as to render probable a due result. Moreover, the expenditure of ammunition needed must not be so great as to render it likely to leave the troops without a proper supply when decisive ranges are reached, *i.e.*, if large, a fresh supply must be certain.

It may, postulating the above conditions, be made use of on the offensive. When it is necessary to enable troops to advance, or some decisive advantage may be obtained from it, *e.g.*, if the enemy's artillery can be affected, or the assailant's artillery cannot properly support the advance: also, when its use will facilitate the advance of other parts of the line, or when it is possible by employing it to concentrate an overwhelming fire on the point to be attacked, or when it can be used to enfilade a position which affords good cover against frontal fire.

On the defensive, long-range fire may be used so soon as proper targets are offered by the assailant. Again, a part not attacked can use it to bring an oblique or enfilading fire to bear on the troops attacking another part of the position. It may be used to stop the pushing forward of the assailant's artillery and also to hold the enemy at a particular part and prevent him advancing from it.

It may be employed on the offensive or defensive alike for pursuit, to cover a retreat, or against the enemy's staff and reconnoitring bodies of cavalry.

¹ A *schwarm* consists of four to seven files under a non-commissioned officer.

Two sights, differing by 100 paces, may be used for moderate ranges, three at the most for long ranges.

The battalion commander, as a rule, will determine when fire shall be opened, failing him the company commander; the section or group leaders only when they are acting independently.

The company commanders (failing the battalion commander) order the opening of fire, and designate the point to be fired at. The method of command is the same as in the Prussian Regulations, viz., the direction to be aimed at, the target, and then the sight or sights to be employed. If more objects than one present themselves, they should be fired at successively, i.e., the second should not be fired at till a proper effect is produced on the first. The detail command of the fire is left to the section leaders.

When the company is firing at long ranges, it may be desirable to fire volleys to ascertain the range. These will, as a rule, be fired by the section nearest the Captain. In this case, as soon as it is seen that the range is obtained, the whole body must immediately fire, since the objects fired at at long ranges are usually visible but a short time.

The group commanders superintend the firing of their groups, carefully carrying out the orders of their section leaders. They must see that fire is not opened without orders. If they are good shots they may stimulate their men by an occasional shot, though as a rule they are not to fire. Before the group advances, or before the rapidity of fire is lessened, e.g., independent fire changed into volleys, the group leader must see that the fire is completely stopped.

The section commanders are not to open fire from their sections, except when they are acting independently. It is their duty to superintend carefully the fire of their men, and to observe its effect.

The section and group leaders must keep themselves acquainted with the amount of ammunition in possession of their men, and see that a fresh supply is sent for in due time.

The section commanders must see that firing ceases—

- (1) When an effect is no longer produced by it, or when an interval of rest is ordered;
- (2) Before an advance, unless the section in question be covering the advance of a neighbouring one;
- (3) To deceive the enemy, e.g., to make him think a position is abandoned;
- (4) When the ammunition is getting exhausted, in order to reserve the available amount for the decisive moment.

Fire should gradually increase in volume as the range becomes shorter and the target better seen, or otherwise more favourable. The greatest rapidity of fire should be made use of, and every rifle available put in line just before the final advance on the offensive, and when that has succeeded, in the pursuit, or to stop counter-attack when an attack is unsuccessful; on the defensive, as soon as the assailant arrives within close range, to pursue him when defeated, or to cover the defender's retreat.

The fire should also be as rapid as possible when large targets such as columns, batteries, &c., are fired at, or in case of surprise, but is at once to be stopped the moment the object is gained, and a calm, slow fire again opened.

Fire discipline requires the most exact carrying out of orders, a careful use of the rifle, quick observation of the signs and orders of the section or group leaders, continual observation of the enemy's fire, and calm demeanour under it till the order is given to open fire, an absolute cessation of fire the moment the order is given, or the named number of cartridges have been fired.

All these points must be so carefully instilled into the men by careful training that there may be no doubt as to their carrying them out on service. A soldier who is a good shot will never fire unless a good effect is to be obtained, he must be taught that a proper effect is to be got not from rapidity but from good aiming. If, in addition to this, he be trained to be calm, and to understand the difficulty of replacing ammunition during a fight, he will undoubtedly learn to be careful in expending his cartridges.

Having dealt with the question of fire discipline, I will now describe the various systems of ammunition supply.

The Prussian soldier with the new equipment carries 100 rounds on his person instead of 80 as formerly. It is intended to introduce company ammunition wagons to be drawn by two horses; but at present the greater part of the infantry have the battalion ammunition wagons drawn by six horses, which contain 19,200 rounds, or about 20 per man. In addition to this, each company baggage wagon contains 2,880 cartridges, so that altogether the soldier has with him—

On his person	100 rounds.
Battalion ammunition wagon....	20 „
Company baggage wagon	12 „
	<hr/>
Total	132 „

The four ammunition columns have each 24 wagons similar to the battalion ammunition wagons, and carry under the latest regulations 65 rounds per man, making a total for each infantry soldier present in an army corps, of 197 cartridges.

Before an action is commenced, the ammunition wagons of a regiment or brigade are as a rule united together under a mounted Officer in a secure position, about 900 yards behind the fighting troops. In case of need they must be taken up to the fighting line regardless of loss. The cartridges are to be taken from the ammunition wagons to the front by men from each company, and supports sent in to the fighting line should take with them cartridges for those already engaged. Both Officers and men must on every occasion remember to complete the ammunition supply, and that without any reference to the regulation number of rounds to be carried in the pouches, any extra supply brought forward being disposed of in

the havresacks or pockets of the men. Cartridges should be taken from the wounded and dead. If the ammunition wagons cannot accompany the men, additional supplies must be served out before the fighting commences.

On the defensive, especially in a prepared position, ammunition boxes should be placed in the firing line, or cartridges may be stored in casks placed there for the purpose.

As soon as the fight is over, the men's ammunition must be completed either from the company or battalion wagons, and the latter must be filled up from the ammunition columns.

The French Regulations for ammunition supply are much the same as the German. The French infantry soldier, armed with either of the large-bore pattern rifles,¹ carries on his person 78 rounds. Each battalion has an ammunition wagon, drawn by four horses, which carries an additional supply of 18 cartridges per man, while 2 rounds per man are stored in the company wagons. Each man, therefore, in the battalion has available 98 rounds. In addition to these the two infantry ammunition columns of an army corps carry a reserve supply of 46 rounds per man, and the park of the army corps² carries an additional 33 rounds. The total number of cartridges per man in the French Army Corps is only, therefore, about 177, as compared with 197 in the Prussian Corps.

On the field of battle the battalion ammunition wagons of a regiment are as a rule grouped together in as safe a position as possible, not more than 1,100 yards from the fighting line, less if the ground be favourable. In critical circumstances they may be ordered right up into the front; their position by day is indicated by a yellow flag, by night by a lantern of the same colour. The cartridges should be collected from the dead and wounded and distributed among those fighting. Before reinforcements are sent into the shooting line, the men should have one or more packets of cartridges served out to them, and every opportunity of replacing the cartridges consumed should be taken advantage of during pauses in the fight. No man must be sent back from the fighting line for the purpose of bringing up ammunition. Cartridge bearers must be furnished from the companies in reserve. They are provided with double havresacks kept in the ammunition wagons, and which are capable of holding about 60 packets of cartridges, *i.e.*, 360 rounds, weighing 37 lbs. 6 ozs. Having carried the ammunition to the fighting line and distributed it, the bearers return for more. On the defensive, a supply of cartridges should be ready at hand for the firing line, and the ammunition wagons even may be brought up close to it, if they can be sheltered from the enemy's fire.

The Austrian Regulations for ammunition supply have lately been considerably modified. The number of cartridges carried by the men

¹ I am unable to give any details of the new arrangement consequent on the introduction of the Lebel rifle.

² I do not take into consideration, in dealing with the German Regulations, the supplies carried in the parks (*Feld-Munitions-Parks*), which carry about 12 rounds per man, because these are not immediately available in battle.

has been raised from 70 to 100 rounds. The battalion wagons have been replaced by company wagons drawn by two horses, and containing 7,000 cartridges. The Divisional ammunition column supply has been increased, as also has that carried by the parks in rear, so that the soldier armed with the 11 mm. rifle has available—

On his person	100 rounds.
In the company ammunition wagons	35 "
In the Divisional reserves	48 "
	<hr/>
Total....	183 "

The ammunition wagons of a battalion are as a rule kept together. They follow the battalion reserve in an attack as closely as possible, but making the best use of the ground, and keeping as much as possible out of reach of the projectiles fired at the troops in front. When the whole battalion is in the fighting line, the wagons keep as close to it as the available cover permits. When under artillery fire they should be kept 20 paces apart.

The position of the ammunition wagons is marked by a red flag by day and by a green lantern at night. These indications should not be visible to the enemy.

When fighting is expected the men should have twenty rounds additional served out to them. As soon as the combat commences, the companies in the fighting line send six to eight men (bandsmen or pioneers when possible) under the command of a non-commissioned officer to the ammunition wagons. Each man is there provided with a haversack containing 300—400 cartridges, and the whole return under the command of their leader to their companies. It is the duty of the battalion commander to see that any further supply that may be needed is furnished. As a rule, it will be taken by the reinforcements going into the fighting line, or by men from the reserve under the command of a non-commissioned officer. These will remain at the front and not come back.

Cartridges should be taken from the dead and wounded, and the pioneers during a fight should be utilized to replace ammunition which has been expended, and to equalize among the men the supplies they have.

On the defensive the wagons may be emptied of their contents, which may be distributed among the men, or placed at certain points along the line for distribution.

From the facts I have laid before you this afternoon it will be plainly seen how much stress is laid by foreign nations on the preparation of their men for the difficult rôle of modern fighting. I have chosen the three principal military nations for my purpose, though I might have added others. Italy and Belgium both have systems directed to the same end, the ordered control of the men in the fighting line.¹

¹ In both the Belgian and the Italian Armies the subdivision of the fighting line is more minute than in others; it would, however, be beyond the scope of this lecture to deal with this matter in detail.

Indeed, the field exercises of these two nations are particularly worthy of notice, as they represent the earliest and the latest endeavours in this direction. These endeavours all point to one control over the fighting line by its division into units capable of being influenced by one man.

In the Prussian Army the unit on which the regulations are based is the *zug* (section or third part of a company), the war strength of which may be assumed to be about sixty to eighty men. In the French Army the section or fourth part of a company is the unit, but this is divided up into half-sections and squads, the latter numbering twelve to fifteen men. In the Austrian Regulations the use of the company is based more upon a lower unit, *i.e.*, the *schwarm*, and in both the Austrian and French methods, considerable stress is laid on keeping the smallest units together so as to avoid confusion and facilitate command.

When General (then Colonel) Bronsart von Schellendorf wrote his reply to the well-known pamphlet of the late Captain May, he stated as one of many objections to the author's suggestions, that he wished to sweep away all ranks between General and Lieutenant; do not these regulations which I have described to you to-day point in this very direction? More in the direction that May really meant. That is to say, it is becoming more and more acknowledged every day that infantry fighting is a matter of small units intelligently led, all directed to a common end, mutually supporting one another, but in themselves of such a size that one man can lead them. This work naturally devolves on the lower ranks of Officers. The higher ranks, therefore, under the present conditions of fighting cannot have the same influence as they had when men moved in close formations. To lead men under fire was always difficult. The difficulty has enormously increased of late years, owing to the complete disintegration of the larger units which takes place owing to the murderous nature of modern fire. To meet it at all successfully we must arrange for a proper division of the fighting line into units manageable by one man. We must arrange for the replacing of this man should he and his successors one after another be shot. We must see that the men in these units are trained to keep together, both for mutual support and to facilitate reinforcement, and last of all, though by no means least of all, we must train the men so that while obeying implicitly their leaders so long as they have any, they may, when all these have gone down before the enemy's fire, still know how to act together to gain the object of the fight.

All this means training, and no mere description of the dry regulations can give you an idea of how these principles are inculcated in peace practice. To learn this, you must go, if you wish to learn the Prussian system, to Germany, and there watch the careful training of the men to this end. Then when you have seen and appreciated how long and careful it is, go to the battle-fields of the last war and see by careful study on the ground how these principles have been applied in practice. I am afraid that to some in England such an education would prove a rough awakening from dreams of unrealities

in which they have indulged. But better far that this should be the case than that those dreams should be dispelled in actual warfare at the cost of blood, and it may be disaster.

In conclusion, I would draw your attention to the increased ammunition supply which both Prussia and Austria have already given to their men. These supplies will be considerably augmented when the new small-bore rifles are introduced. We shall see in the next European war, not perhaps a reckless expenditure of ammunition such as was indulged in by the Turks in 1878-79, but we shall see a great deal more infantry firing than we have hitherto seen. Men *will* fire when they suffer loss from the enemy, and with the long ranges now available fire will be opened earlier, and more ammunition will be required than under former short range conditions. To conduct fighting nowadays, to see that ammunition is properly expended, and to keep up a proper supply will be no light task; far harder will it be, far more scientific, if I may use the term, than fighting under the old conditions. But the new departure should present nothing difficult to the British Army if it will but remain true to the old guiding lines. It was superiority of fire which gained the reputation of English bowmen, it was superiority of fire by which Wellington beat the French at the beginning of this century. If the national aptitude for shooting be carefully trained we can hold our own under the new conditions. But it must be trained, and training is not to be got on the barrack square, but by careful practising in peace the tasks that fall to the soldier in war, under conditions which represent, in everything but loss of life, the actual realities of modern fighting.

APPENDIX.

WHILE this lecture was in course of preparation, the introduction of the Lebel rifle into the French Army brought about changes in the regulations for the use of the infantry weapon which modify to some extent those hitherto in force and which I have given in the body of the lecture.

The Lebel rifle has a calibre of .315 in. and weighs 8 lbs. 12 ozs. The barrel is rifled with four grooves double the width of the lands, having a twist of 1 in 27½ cals. The cartridge is in shape similar to Hebler's, described in my lecture on Magazine and Repeating Rifles. (See Pl. 5, vol. xxxi, p. 135, Journal of the Institution.) The muzzle velocity is said to be 2,280 ft. secs. The trajectory is exceedingly flat, the 400 m. sight serving to cover the ground up to 600 m. The rifle is sighted up to 2,000 m. Up to 800 m. the flap is not turned up, the elevation being obtained by pulling the slide up the flap until it rests on the step of the bed graduated for the required range. The right side of the leaf is graduated in 100 m., the left in 50 m.

The magazine holds eight cartridges and is placed under the barrel as in the Kropatschek. It can be "cut off" when not required. The breech action is believed to resemble the Gras, except that the bolt when home grips on both sides of the bolt-chamber.

The chief changes in the regulations for the use of the rifle are as follows:—*Close* ranges are now extended to 660 yards; *moderate* ranges are included between 660 and 1,320 yards, while all over the latter distance are *long* ranges. Fire is to be conducted by groups not exceeding a section

(*peloton*). On the offensive fire should only be opened when it will be efficacious, and care should be taken to proportion the expenditure of ammunition to the object to be gained. On the defensive fire may be opened as soon as the enemy becomes vulnerable. Its rapidity should be proportionate to the ammunition available, and when the supply of cartridges permits, it may be as intense as possible from the first. The various kinds of fire are, *volleys, independent fire, rapid fire, attack fire, and magazine fire.*

Volleys may consist of one round only, or the magazine may be used, especially if the object be visible only for a short time. They may be made use of at *moderate* ranges, they can rarely be used at *close* ranges, independent fire will then usually be employed. Magazine volleys may be fired at suitable objects visible only for a short time at *long* ranges, i.e., over 1,320 yards.

Independent fire is used at *moderate* and *close* ranges, and is conducted as in the English service, but the number of rounds is never specified, the soldier continuing to fire till ordered to stop. Unless the nature of the case render it desirable for the whole line to fire, the best shots of each group only should do so.

Rapid fire, either from the magazine or shot by shot, is confined chiefly to *close* ranges or against very vulnerable targets at greater distances. It is the quickest rate of independent fire possible when the rifle is used as a single-loader. The soldier should be able to fire twelve rounds in a minute.

Attack fire is independent fire delivered while moving forward, and is only to be made use of during the last period of the attack. The men will at first use the magazine and when that is empty continue the fire, using the rifle as a single-loader. The 400 m. sight is always to be employed, and the bayonet must be fixed as soon as this nature of fire is ordered.

Magazine fire is only to be delivered by command, but is not necessarily confined to any one stage of the fight. It may be employed in combination with rapid fire or volleys. When firing volleys the soldier should be able to empty the magazine in forty seconds, or in thirty, when firing rapidly.

The foot of the target is always to be aimed at. Two sights may be used when the distance cannot be judged with certainty within 200 m.—W. H. J., 24th September, 1888.

Colonel Sir LUMLEY GRAHAM, Bart.: Captain James has done very good service in pressing upon us the necessity of fire discipline. It is a necessity that has been over and over again impressed upon us, and it cannot be too often impressed. He has given us an account of the view that different Continental armies take of the infantry fight, and how it is to be conducted. I do not think he has said much about the preparation of the soldier for that ordeal, but all foreign armies take the greatest possible pains with the preparation of their soldiers to fight, and above all that Prussian army to which he devoted a great deal of his lecture. He told us it was necessary for us to go to Germany to acquaint ourselves with the mode in which soldiers should be trained, but it is not open to all of us to go to Germany or Prussia to see how the soldier is trained. He has had that advantage, I have no doubt. But we have a great many accounts in our language now of the way in which the German soldier is prepared for war. At the risk of being thought egotistical I will refer to a long account which I published in the Journal of this Institution as far back as the year 1881 or 1882,¹ a series of papers in which I described the views taken by different foreign armies of the action of infantry in war, and I also particularly enlarged on the training of the German soldier for that object. There was a long account, I remember, given in the paper of the practical training of the German soldier with a view to fire discipline, and I

¹ Journal, vol. xxx, Nos. 109 and 111.

should like to refer some of those present to those articles, as they may complement Captain James's lecture. Discipline of course is the first thing that the soldier has to learn, discipline in the large sense, before we come to fire discipline, because fire discipline after all is only an application of discipline in the large sense to one particular object. How discipline is to be taught and from what discipline proceeds is a very large subject indeed. I am not going to enter into that. To begin with, the time would not be sufficient, and also it is to be the subject of the essay for the Prize Medal of this Institution this year. The subject of the essay will include no doubt fire discipline. Fire discipline is a branch of discipline, and a very important one, of its own. The very word "fire discipline" has been introduced by that nation which has learnt to carry it out to the utmost—the German nation, and every other nation has borrowed that word. Fire discipline, like all other sorts of discipline, comes principally from the action of the Officer, and Officers cannot ensure good discipline of any sort unless they are thoroughly instructed in their profession. With regard to fire discipline especially, it requires a great amount of training both in Officers and men for it to exist in any shape, and a vast amount for it to exist in its most perfect shape. The Germans promote that fire discipline to a very large extent by a great amount of what we call field firing—of what they call firing representing battle (*"gefechtmässiges schiessen"*). We carry that out to a certain extent, I am happy to know, but I think there is one very important sort of training leading to it which we at present have neglected, I mean the company field firing. Every German company, before it is allowed to practise field firing with the battalion, or afterwards with the brigade, has to undergo a course of field firing under its Captain. The Captain, as we all know, in the German Army is the great instructor of his men, and the more we can make the Captain in our army the great instructor of his men the better. That very system which Captain James has so well described of the devolution of authority from the highest, dividing the authority among all the subaltern Officers, and even the non-commissioned officers, down to those of the lowest grade, so as to make the direction and control of men in battle possible under the present conditions of warfare, that is only arrived at by the most careful training, and a great deal of that training is given in that very field firing that I am talking of. Anyone that does me the honour to read these papers that I have already alluded to, published in the Journal of the Institution, will see a long description of the way in which the field firing is carried out in the German Army, always with a tactical idea in view, so as to assimilate circumstances as far as possible to those of the battle-field. When this course of training has been carried out steadily in a systematic way, every Officer, every non-commissioned officer, and every man knows his place in his company and battalion, and we can quite understand that when they come to actual warfare they feel much more at home than troops which have not had that sort of training. Therefore I hope that that training will be carried to a very much greater extent than it has been hitherto carried in our army. There is another way, I think, in which the training of troops for fighting and for making good use of their arms will be very much stimulated, and that is by inspection in field firing. At present, if I am not mistaken, inspection in firing with ball is never carried out by a General Officer in our army, except in India, where it is done. But it would be a very important improvement to introduce, that the General Officer should devote less time to some of the parts of military training which are of minor importance, and devote a great deal to that very important part of it, the shooting of the men, and not only their shooting at targets, but their shooting as it were in action, in what is the nearest approach to the conditions of the battle-field. I can quite imagine that any Officer in our Service (I am sure it would be so in my case) if taken to the battle-field without ever having had an opportunity of leading men against the fearful arms now in use, would be very much at a loss how to direct his men to make the best use of their arms, and to assume the best formations for attaining his object. But if he had the long course of practical training which is given to the German Officer and soldier, he would feel very much more confidence in himself, and I think it is only fair that our Officers, the greater part of whom are perfectly fit to do any duty that they are called upon to perform, it is only fair to them that they should have that opportunity of learning

their work thoroughly, which other armies, and especially the German Army, enjoy. I hope some Officers who have seen some of the more recent fighting will give us their experience of fire discipline.¹

Captain WISELY, R.E.: I must apologize for taking part in the debate, but my object is to make a very few remarks on Captain James's paper rather with a view of supplementing what he said about the French Army than of discussing the subject of his lecture generally. With your permission, Sir, I will refer to a few notes I made before coming in, which I would have had great pleasure in forwarding to Captain James if I had seen the lecture earlier in proof. I presume the French Regulations quoted by Captain James were those of 29th July, 1884, which have been in use up to May of this year. New regulations were issued on the 3rd May last. Firing by three rounds at a time is abolished, and the different sorts of fire are now:—Independent fire (*à volonté*), rapid fire, repeating (or magazine) fire, volley fire and attack fire (or "fire on the march"). On the offensive, the firing begins at about 800 metres distance,² and is carried on independently (*à volonté*) up to 500 metres. Between 500 and 350 metres "magazine fire" and "rapid fire" are employed, then immediately the order is given to advance, and to commence "attack fire," i.e., "firing on the march." At 100 metres, the troops cease firing, charge and assault. On the defensive, fire commences when the enemy appears at between 1,000 and 900 metres. It is continued by volleys and independently (*à volonté*) till the enemy is at 400 metres. Rapid fire by successive shots is then made use of. Magazine fire is reserved for the moment of the assault. These regulations give quite a new feature in fire tactics, as far as I am aware, that is, firing on the march. The regulations are for the use of the Lebel rifle, M. 1886, and, with regard to the amount of ammunition carried, from notes which have appeared in the French newspapers at different times, it would appear that about 108 rounds are carried on the person by the infantry soldier, and this amount of ammunition weighs considerably less than that carried hitherto by the French soldier.

Major GUNTER: I would ask the lecturer if he can give us any information as to whether it is intended to introduce any bandoleer pouches. This is a small matter, but from late experience in practising skirmishing with our own men, I found that the cartridges almost always tumble out of the pouches when they run forward; and the men keep on stopping to pick them up. They will do it, they would do it in action. The result is, you cannot get the men to go forward in a line together. I think the attention of the authorities ought to be directed to the defective nature of our pouches. It has been often suggested that bandoleer pouches worn over the shoulder would be a great improvement for carrying ammunition in the field, which of course is of great importance. Sir Lumley Graham stated that no company field firing is carried on by the British regiments. I think Sir Lumley cannot be acquainted with our present regulations. We do carry on company field firing under the recent regulations, and before we go to battalion field firing, where there are ranges available. The great difficulty in England is the question of rifle ranges. Until proper rifle ranges are provided for troops, practical effectual field training cannot be carried on. That is of course a question of expense. In India, the field firing practice is carried on in the most thorough and efficient manner, both by companies and on a large scale. I have had the advantage of seeing the Germans at their field firing; and I can only say that where good ranges are available, our practice of field firing is in no way inferior to that of the Germans. With regard to the General Officers, I may say General Officers now do personally attend at the field firing practice and long-range practice, and moreover, the annual training of the regiment is carried on under the direction of the General Officer commanding

¹ I was very glad to hear from Major Gunter, who spoke after me, that instruction in field firing is now carried out much more completely in this country than I had supposed. Still Major Gunter admits that it would be more complete if there were a sufficiency of good ranges, which is unhappily far from being the case.—L. G.

² These distances are defined for instructional purposes on level and open ground.

a district. The Commanding Officers submit to him the practice they intend to carry on year by year.

Sir LUMLEY GRAHAM: Does the General Officer make it part of his annual inspection?

Major GUNTER: He goes down at different times. The General Officer also causes the regiments to carry out the regular field firing practice. The General Officer has so many rounds at his disposal for the purpose of carrying out experimental fire tactics.

Sir LUMLEY GRAHAM: Then there has been very great progress made. You must allow for my ignorance as an old soldier.

Major WALTER SMITH, R.A., D.A.A.G. for Instruction: It is a very great satisfaction to me, Sir, to find Captain James dealing with a subject from an absolutely independent point of view, yet arriving at identically the same conclusion which I had myself reached when I was approaching a distinct topic in this theatre not very long ago.¹ It is also the point from which he draws the principal moral of his paper, namely, the division of the fire-line into semi-independent groups, each under its own leader. It seems to me a matter of very small importance what you call them, whether "züge" or "sections," or anything else; but the crucial point is to break up the fire-line into groups, each under a leader with his own sphere of responsibility and command. As far as the attack has been carried on in our Service till within the last year certainly, responsibility as regards minor fractions absolutely lapses directly troops take up their most important rôle, namely, the fighting formation for the attack. In the paper I then read (a point which I may be perhaps allowed to advert to because you can hardly drive a useful nail home too firmly), there were one or two detailed features by which I endeavoured to give extra independence and to define in a more marked manner than previously those sections in the fire-line. One was that to each of the four men who were, under my proposal, to form the two flank files of sections, I gave distinctive badges, a feature which might prove very helpful for "rallying" and other purposes. The Prussians endeavour to separate their groups one from the other by allowing certain intervals between them; and as far as I understand the recent instructions in our own Field Regulations the same principle is embodied. I think, however, that these intervals will very likely disappear in the stress of actual fighting; and as it is all-important to keep the sections as distinct as possible I suggest that distinctive badges should be put on the outside arms of the flank men. These flank men would be only second in importance to the two non-commissioned officers who had the section; and in the event of casualties carrying away the two leaders these flank men (who would be respected as men always are who hold recognized posts of responsibility) would naturally step into their shoes. Now it seems to me it is not for the purpose of fire discipline alone, although that is no doubt the primary consideration, but on other occasions as well, that this independence of sections becomes a matter of very considerable importance. When a sudden counter-attack has to be met, and you want to throw the troops rapidly into some other formation for receiving the blow, or for rallying the men after a successful assault, or for the chance encounter at close quarters, it is of the utmost importance that there should be some one official responsible for collecting around himself as a nucleus, and subsequently directing, each particular group of men. Then, as regards fire discipline itself, this becomes much more easy when the men have been accustomed to receive orders habitually from the same Officer or non-commissioned officer in quarters as well as in the field. In fact, I advocate that this demarcation, separating off specific sections from each other, ought to be introduced more consistently than it now is into the daily life in camp or in barracks; in other words, that administrative independence should be accorded more and more decisively to them. The non-commissioned officer in charge should be the channel of responsibility and command on all points in quarters, and in that way you would establish a sort of family feeling in the group which would be of exceeding value whenever questions of discipline, of field efficiency, or of sudden emergency were at issue.

¹ "The Mechanism of the Counter-Attack," see Journal, No. 144.

The subdivision of a field battery under the command of its No. 1 will furnish a nearly exact analogy.

Colonel STERLING (on being called upon by name by the Chairman): Having but just arrived, I am not prepared to give a detailed answer to this very skilful paper of Captain James, for which I am personally very much obliged to him. But there are some remarks which have been made in the discussion, about which I have a contrary opinion. In the first place we must remember that the "zug" of the German company is about the size of one of our companies, and if you divide that and have a divided authority further down, you will get to a very small unit at last. I might further say, from some practical experience of the training of soldiers, there is not the slightest difficulty in keeping sections clear for field firing by the present arrangement which is allowed us by the drill-book. I have done it repeatedly in field firing, and find there is not the slightest difficulty; it is a mere question of training your men originally. You do not want "badges" for flank men, in my opinion. You will not be likely to have a section commanded by less than a sergeant, and you have your corporals and your lance-corporals for flank men, if considered advisable, but of that I have grave doubts. Your badges would lead to confusion if there were losses, and you would have to mix the men eventually. In fact, the remarks of the Officer on the opposite side have been rather hypercritical, if you will allow me to say so. As regards attack by sections in the field, I have seen it done in defence, and then it was thoroughly efficient. On one occasion I was practically in command of two non-homogeneous bodies on service when the attack took place. One body fired rather wildly; I had to sound "cease firing" altogether, because one body was firing the wrong way, which was awkward for people on our own side. The other day it was under my own personal command that field firing by sections was carried out, and there was not the slightest difficulty. I do not think that with troops trained in the same way you would find any more difficulty in the attack than I did on service in defending, and I think it is a mere question of training in peace. I most cordially endorse what Captain James has said, that you must carry out in your practice-training in peace-time, what you intend to do in the field. Under the present short enlistment system I do not think you can have a great many diverse ways of carrying out this important practice. I have lately been commanding, as Brigadier, six, seven, or eight different regiments; every one of them has a different way of firing, and every one of them has a different way of attacking. That does not meet my views. Of course every man thinks he is right and the others are wrong; *cela va sans dire*; but the other commanders equally take their own opinion. I may congratulate Captain James on his position in having been able to speak as strongly as he has done, which perhaps some of us cannot do.

The CHAIRMAN (General Clive): This lecture is headed "Fire Discipline and the Supply of Ammunition in the Field as provided for by Foreign Powers." I take leave to say that as far as I am personally concerned I have been thoroughly aware of our shortcomings in this matter for a long time. Eight years ago, I had the honour of giving two lectures in this Institution on Tactics and the Supply of Ammunition to Troops in the Field,¹ and I am very much obliged to Captain James for renewing the subject, because I think it is the advantage of this Institution that if we only speak loud enough and often enough, by degrees we shall get more attention paid to our shortcomings. The subject is, moreover, far more important now when we are introducing magazine rifles, and shall expend our ammunition far quicker. My difficulty is the physical one how in the heat of action to transfer rounds of ammunition from the S.A.A. carts to the troops in the fighting line. It is impossible to take troops out of the fighting line: this is conceded. Such troops, whether their pouches are empty or full, must advance with those sent to reinforce them; or as it is now expressed, to carry them forward: there is no stopping when you get near the enemy. I was hoping that Captain James would have made some suggestions by which this physical difficulty could be overcome: some system of distribution, which could be practised and tested, and if satisfactory, ordered. Captain James probably thinks that it is more our business to suggest these systems than his; he

¹ See Journal, vol. xxii, No. 97, 1878.

is content to point out the difficulties, but he says it is for you Commanding Officers to devise some system by which you can supply your troops with ammunition. Gentlemen, the first condition to ensure troops keeping ammunition in their pouches is to keep their heads cool, and that can only be done by training, i.e., fire discipline. It has happened on service that Officers, so far from keeping the heads of their men cool, have excited them, and the result of this course must be a waste of ammunition, which, if no fresh cartridges are supplied, will result in those troops being defeated if the attack be prolonged. The first point is so to train the men to keep their heads cool, that they only fire when they can hit their mark. If a man only fires when he is certain of hitting, and if every man can be trained up to that point, I do not think it will be possible for any enemy to come near a line of infantry on the defensive. But when you have so trained troops, you must nevertheless have some system of refilling their pouches. We know that a small-arm ammunition cart is supposed to be in rear, but nobody knows where. The brigade may be deployed over a long front, and some battalion wants ammunition, but where the S.A.A. cart is nobody knows. The cart may be concealed behind a wood, or stuck in a bog—or unable to advance; the men are short of ammunition, nobody knows where to go to procure it, or if by good fortune the cart comes up to the rear of the line, you see about twenty men round it, and half the ammunition falls on the ground. There is no system. If we are to be prepared for war, there ought to be some system laid down by which the man in charge of S.A.A. cart is made responsible that it is at a certain place, or if not, that that fact is communicated to the troops. It should be somebody's duty to keep in view the cart on the one hand, and the troops on the other, and in each section or company someone should be told off to attend the cart and carry the ammunition back, so that the ammunition can be certainly transferred from the cart into the pouches of the men. That is the only way in which to meet the difficulty. Aldershot has been a camp of instruction for nearly thirty-three years, and every year the troops have occasionally run out of ammunition. The British soldier rather takes a pride in firing away the whole of his cartridges, and then lying on his face in the heather in the hope that he won't be sent any further away from his camp. Instead of that, the soldier ought under no consideration to fire his last cartridges. I should like to see an examination of the pouches ordered during pauses in the fight, when the "Cease Firing" was sounded, and every man with less than five rounds of ammunition in his pouch should be reported and punished. Soldiers would soon learn to husband their ammunition, and they would save their lives when they found themselves in action. Field days at Aldershot should be used for practising the troops in running out of ammunition, just to test their system of replacing it from the S.A.A. cart. For instance, serve out twenty rounds and keep the troops in action till thirty or fifty rounds have been fired, just to see how they are going to procure other ten or thirty rounds, and still leave some in their pouches. If that were done we could practise just as well with 25 as with 100 rounds, without extra expense by testing one battalion per brigade, or one brigade per Division at each field day. We spend time, trouble, and money in training soldiers, and in teaching them what I may call their various accomplishments. Discipline is of the greatest importance, so are education, drill, smartness, and rifle practice important, but the whole of these qualities, important as they are, will be found valueless if we send our men into action without providing some system by which they shall have ammunition enough to fire. I did not mean to delay you as long as this, because the opinions expressed have not been at all divergent. It is, in my opinion, most important to bring these things forward so as to secure efficiency in this vital matter.

Sir LUMLEY GRAHAM: When I was at Aldershot in 1867, we had an elaborate system of replenishing the pouches with ammunition. We did just what you said this moment should be done, we used to go out with from ten to twenty rounds, fire the whole of it away as fast as we could, and then there was a regular established system for renewing the supply. This was done by sending a certain number of men from each company with haversacks to the ammunition wagons drawn up in rear of the brigades, to fetch the cartridges which were then served out to the men in a very systematic way. I should like to ask what has become of this system, if we have not got any now. Has it been allowed to die away?

The CHAIRMAN: That is what I am asking for; there must be an absolute best way of doing everything, and I conceive it would not be very difficult to find out what is the best way of attaining this very simple object.

Sir LUMLEY GRAHAM: I thought there was an organized system in our Service.

The CHAIRMAN: There is a system; my complaint is, that it is not practised at field days to test its efficiency for service.

Colonel STERLING: May I say, as far as my experience goes, what they have generally used in the camps that I have seen, have been baggage animals, and there have been pioneers or some other people who have had to go and get the ammunition from the baggage animals.

Major GUNTER: It was laid down last year distinctly how to get ammunition.

The CHAIRMAN: What I want is to see it practised. Will Major Gunter assert that he has seen the system regularly practised and tested?

Captain JAMES: I do not think there is much for me to say in reply to the various remarks which have been made to my paper. Of course, as Sir Lumley Graham remarked, anybody who chooses can find a great deal of information in this country on the question of the individual training of the Prussian soldier. We have had two or three pamphlets translated and published in the Proceedings of this Institution. There are Sir Lumley Graham's papers on this subject, mine on musketry instruction and long-range fire, and that on the training of a company translated by Colonel East. There is also Baron Kaulbars' book which has been translated into French, and if you go to German there are a thousand books on the training of the soldier setting forth the various systems which different Officers think are the best way of training the men for taking their place in modern fighting. But what seems to me the great point in the Prussian Service and their system of training, is first of all that there is no rigidly defined system laid down. The result is looked to, and the trainer has to act according to his own lights. If he does not get the required result he feels the consequence, and if he gets it he may get it in the way he thinks best. We have nothing of this sort in England, there are a few books which deal with the question of individual training, and there are certain regulations for the tactical training of the company. I am in a position, which I daresay many of you know, where I see Officers of all regiments, and I am always a person who asks questions, and I have collected the evidence of thirty-seven Officers on the question of the tactical training of companies as at present carried out, and I am sorry to say that the general consensus of opinion is that the training, as at present carried out, is scarcely of a practical nature. I have not the documents with me to-day, but I can give you a few examples. They say, "We have a certain amount to do of field work, but my doing field work consists in marking out in the barrack square shelter trenches." Nearly the whole thirty-seven combine in the one point that the portion of the instruction which is devoted to company drill is perfectly useless. It is about as wise as the spring drills which are the bane of everybody who has arrived at a certain age in the British Army. Captain Wisely alluded to the French Regulations recently issued. That deals with the Lebel rifle, and as I was not able to put the thing completely before you, I did not enter into it.¹ I will give a *précis* of this new instruction in the points that differ from the instruction of last year, and put it at the end of the paper. Major Gunter asked if I knew whether any nations were using bandoleers for cartridges. I do not think any of them are. The Circassians in the Russian Service use pouches across the front, but there is no bandoleer, and I must say from my own experience, I should hope that the English will not adopt them. If they were used with the Boxer cartridge, the cartridges would soon be spoiled, because they would get knocked out of all shape; and even with the solid-drawn cartridge, if the belts are carried day after day, taken off and thrown on the ground, the bullet in the cartridge is very apt to get loosened, and they are very likely to be deformed, therefore, I do not think the bandoleer is a good way of carrying the cartridge. I have here a case which was

¹ The first two parts of the new French Infantry Exercise, viz., the *École du Soldat* and the *École de Compagnie*, were published about the time the greater part of this lecture was in print; the *École de Bataillon* was not issued till after the lecture was delivered.

exhibited some time ago, in which the cartridges are put in separate compartments. The Austrians have a pouch very similar to this; it is divided into two halves, the outer row of cartridges being lower down, and there is not the same accurate division. With regard to what Major Smith said as to the division of the firing line, I drew attention to this subject seven years ago in a lecture on "Modern Fire, its Influence on Armament, Training and Tactics."¹ I said then what I say now, that the only point that you can definitely lay down is the division of the fighting line into fighting units, the fighting unit being the number of men one leader can influence in the circumstances of close fighting. I do not think myself I should agree with him as to the distinctive badge for the flank men of sections or smaller units, because I do not quite see if the enemy unfortunately kills your badgemen what use the badges will be to you; I think the same remark applies to him as to the system of infantry attack, which is advocated by a very well-known legal gentleman. It seems to me, the great objection to his system of attack is this, that if the enemy does not play fair and does not knock off the men that he ought to do there would be just as much confusion with that as there would be with any other system of tactics. I am very glad that Colonel Sterling agrees with me in what I say, and I must say he has hit upon a point to which attention should certainly be drawn in England, and that is the varied systems of doing things. For instance, we have had changes lately in the field exercises, changes which have been long called for, and which I do not think are very radical in their nature. I was not present myself, but some friends of mine were, at a very distinguished parade a little time ago, and I heard, on very good authority, that instead of the troops forming into line they still wheeled into line as of old. I confess I was very much struck by it, seeing that this was done in the presence of the Commander-in-Chief of the British Army. Now I am not an advocate of everything German because it is German; it is quite ridiculous to take the systems which apply to one nation and apply them to another nation where the conditions are totally different; but still there is a great deal to learn from the German Army. The German Army is the growth of eighty years' constant attention, and we may fairly say, therefore, when we see that they adopt certain broad principles that these are right principles for an army to adopt. Now they have a system which ensures uniformity of instruction. I allude to the training battalion near Berlin, where detachments from all regiments are sent in order that they shall learn the methods of instruction and details of drill on exactly a similar plan, and take these back to their regiments to carry them out there. I think if we had something of the sort in England it would be very valuable. I was very much astonished some time ago to see in the papers, with regard to that peculiar product, the Enfield-Martini rifle, a question was asked what was to be done with it, "we had 100,000 barrels, and whether they were of any use at all?" The reply was most indignant, "They were extremely useful, they could be bored up again and used for Martini-Henry rifles." But I see since then that another use has been found for them. I am extremely pleased to find in these days, when uniformity of ammunition supply is admitted by everyone, that we have just introduced into the British Service a new two-barrelled Gardner gun, which is to fire the Enfield-Martini ammunition, that is to say, we are going to introduce a small-bore rifle—we have already the .450 bore rifle—we are going to introduce a small-bore rifle, and we have deliberately introduced for land service purposes a two-barrelled Gardner with a .4 bore, or thus involving three, ultimately two natures of rifle ammunition. I do not think any comment on such a proceeding is necessary, because the statement bears its own condemnation. I did not go into the question of the training of British troops because I considered I was barred by the terms of the invitation of the Council, and I had previously done it to a certain extent in the lecture to which I have alluded. In that lecture I proposed a system of ammunition supply which is almost identical with that adopted last year or the year before by the Horse Guards. And now with regard to the question of ammunition supply during a fight, to which General Clive alluded, I confess personally I have rather grave doubts whether you will ever supply ammunition during a modern fight, that is to say, I very much doubt whether the men get to close quarters

¹ Journal, vol. xxiv, No. 106, 1850.

you will ever be able to send up ammunition to them. We are all apt to talk as if every one was able to keep his head when close fighting is going on. But I venture to doubt whether the ordinary soldier does keep his head when Dick, Tom, and Harry are going down right and left of him; bringing up ammunition from the rear involves a great deal of keeping the head. Therefore I am a little inclined to doubt when the fighting comes rather close, within 400 or 500 yards, whether you will ever be able to supply ammunition from the rear. It is very well in theory and very pretty at Aldershot, but when we come to the actual fighting of modern infantry I am very much inclined to doubt whether you will be able to supply ammunition except at the initial stages of the fighting or during pauses. The greater reason therefore to have fire discipline, and to see that the men have sufficient ammunition to start with, before the fight. That is very well done in the Austrian Service, where the men before going into action are supplied with an additional twenty rounds, and something of that sort might be adopted here. I have to thank you all for your attention; the subject is rather a dry one for a lecture, but for that you must blame not me, but the Council of this Institution, who asked me to take up the subject.

The CHAIRMAN: Ladies and gentlemen, I will ask you to allow me to be your intermediary in proposing a vote of thanks to Captain James for his lecture.