ONE CAUSE OF OUR DEFEATS: THE SERVICE RIFLE.

THERE can be little doubt that the future of Britain as an Empire will largely depend upon the manner in which, and the promptness with which, the nation will take to heart and profit by the sharp lessons which the present war is impressing upon us all. That there will be a reorganisation of our antiquated military system, an abolishment of that pantomime-like shifting of responsibility for errors of omission and commission, and an introduction of principles that recognise merit, and shall make professional zeal rather than favouritism the high road to distinction, are, one hopes, assured reforms.[1] With these the present pages have nothing to do beyond the recital of facts bearing upon the not unimportant detail of army reform connected with the Service rifle and its use in active service.

The British infantry, it is as well to remember at the outset, has never distinguished itself by its marksmanship. If we can believe competent critics, it must have been quite as bad in the first quarter of the century as it has been during the last quarter, though in the former case there was more excuse for it, for the performances of Brown Bess were truly marvels of bad shooting. General Hanger, who had a British command during the American War of Independence, tells us, in his interesting little book, written in the year 1814, that he was so disgusted with the shooting of the British soldier, that he worked out a scheme of organising a troop of 2,000 riflemen, armed with rifles similar to the American backwoodsman's small-bore, with which these deadly marksmen made good practice at what were then unheard-of distances, *i.e.*, 300 and 400 yards, at which they picked off single men. General Hanger says of the British soldier that he can never be taught to judge distances. "Place an object in the shape and size of a man at 150 yards distant, ask him how far that object is from him; one will say 100 yards, another will say 200 yards. . . . Place the same object at 300 yards, you may as well not ask him the distance at all, for that distance is totally beyond his scale of judgment." Of the soldier's musket, as then furnished to the troops fighting against American and French sharpshooters, he expresses the most scathing criticism: "A soldier's musket, if not exceedingly ill-bored and very crooked, as many are, will strike the figure of a man at 80 yards, it may even at a hundred, but an enemy

(1) This article was written before the entirely inadequate proposed changes in the organisation of our land forces were made public by the Under Secretary for War. Lord Rosebery's condemnation of them will, it is to be hoped, carry conviction and lead to more efficacious remedies.

must be very unfortunate indeed who shall be wounded by a common musket at 150 yards, *provided his antagonist aims at him;* and as to firing at a man at 200 yards with a common musket, you may just as well fire at the moon and have the same hopes of hitting your object. I do maintain, and I will prove, whenever called on, that no man was ever killed at 200 yards by a common soldier's musket by the person who aimed at him."

General Hanger was no more successful in gaining the ear of the War Office than were any of the countless subsequent would-be reformers. The antiquated flintlock musket, or *fusil*, which James I. had first introduced in the English Army, and with which Blenheim was won, was deemed good enough for Wellington's troops when facing the French sharpshooters. It actually remained the army weapon until the year 1842, in spite of the fact that Berthollet had invented the principle of percussion as early as 1788, and Forsyth had patented his percussion-cap in this country in 1807. Colonel Hawker, writing a few years after the latter event, already said: "The copper cap is now in general use all over the world," which it was, both for sporting use and for military purposes in foreign armies. Notwithstanding that such a distinguished military expert as General Hanger wrote in 1814, "I conclude this by repeating, that it is a disgrace to the country, and an injustice to such gallant soldiers, to arm them with so useless a rifle"; his criticism fell upon deaf ears, and the army remained so armed for almost thirty years more. Another well-known expert, W. Greener, writing in 1841, called the British soldier's musket, "the most contemptible of any kind or description of gun I know." With this arm, though supplied with percussion ignition, the Crimea was fought, the new, but not very successful, Minié rifle being in the hands of only a minority during the critical stages of the campaign. Of the wretched shooting of our troops during that war there are numerous records, to which we need not refer at length in this place, for there are other less generally known instances to prove that British infantry fire was very bad. In the Kaffir war, according to Colonel Welford, there were fired, in one single engagement, 80,000 shots, and only twenty-five of the enemy fell. In Ashantee, says Captain Mayne, "more ammunition was used by men firing individually than in some of the most hotly contested European battles." In Afghanistan, our troops, to quote the same authority, shot very badly; for instance, on one occasion—at Dek Sarak—there were fired 28,000 rounds, at ranges under 400 yards, and only 50 killed. In consequence of this highly ineffective "uncontrolled independent fire," to use the technical description, the whole of the ammunition of the force was fired away, and the troops had to retire to camp, followed by the enemy the whole way. The battle of Ahmed Kheyle, during Donald Steward's march from Kan-

dahar to Cabul, was a far closer thing than the British public ever realised, and principally owing to the wild shooting of our men, who blazed away at the Ghazis, at close quarters, with their 400 yard sights up; while the shooting of the English legion under Garibaldi was also of the most ineffective nature. In the Boer War of 1880-1 our shooting was simply a disgrace. Five hundred and fifty-four British troops, armed with breech-loading rifles, and occupying a practically unassailable position on the crest of Majuba mountain, were routed, in broad daylight, by a Boer force *mostly armed with muzzle-loading rifles.*[1] The storming force, in spite of the fearful disadvantage of having, when once they had left the "dead angle" at the base of the hill, to scale the steep slopes exposed to our fire, lost the now so famous "one killed and five wounded," while our losses were no less than 92 killed and 134 wounded.

As most people will remember, it was subsequently discovered that most of the British rifles found after the battle on the Majuba had their long-range sights up, showing that our flustered men kept blazing away over the heads of the Boers when the latter had reached close quarters.[2]

Precisely the same thing has occurred in the present war, as I am in the position to positively assert on the good evidence of English officers. Indeed, in one respect, these recent instances prove that Tommy forgets what little he has learnt of fire drill, even when firing from behind bullet-proof plates, for here were regulars firing from an armoured train, and were discovered by their officer to be using long-range sights at quite close distances, overshooting, of course, the Boers by many yards, for they were firing at point-blank range with their 1,000 yards sights, which means that their bullets passed some 20 or 25 feet over the head of the enemy.

Having said so much about the shooting of the British soldiers, to whose indifferent fire training can be traced many of the reverses in all our recent wars, we reach the main subject of these pages, namely, the rifle with which he is now armed. I may at once say that I have no interest of any kind or shape, direct or indirect, in any business connected with the manufacture or sale of arms in any part of the world, though I think I may claim to have enjoyed somewhat exceptional opportunities to study rifle-shooting, both military and civilian, in many of the principal countries of Europe and in North America. Criticism, to be of any real value, should, obviously, not be tinged by as much as a suspicion of interested motives, such as might be attributed to some recent letters in influential columns.

(1) T. F. Carter.

(2) As a contrast, may be mentioned the instance cited by Moltke, which occurred on the first occasion when military breech-loaders were used, viz., at Lundby (1864), when the Prussians, with 327 shots, killed and wounded 88 Danes.

To enable the general reader who is not conversant with technical terms to follow my remarks, it will be best to exclude scientific phraseology as much as possible, and also to compare the principal features of our army rifle with those of the small arms with which the Boers are now committing such havoc in our ranks. Not counting a large supply of the Martini-Henry, which was our Service rifle up to 1889 or so, the Boers are principally armed with the Spanish Mauser, which is the latest and best of the several types that bear that name. They have also the German Mauser (·311) of the old type, *i.e.*, 1888 model, some Mannlichers (·256), and some United States Navy rifles (·236). In the following table I have given the principal details of each type :—

Country.	Name of rifle.	Bore in inches.	Weight of rifle.	Weight of loaded cartridge.	Weight of bullet.	Muzzle velocity.	Pressure.
			Lbs.	Grs.	Grs.	Ft. Sec.	Lbs.
Great Britain	Lee-Metford . .	·303	9·25[1]	436·7	215	2,000	41,674
Germany . .	Mauser	·311	8·40	425	226	2,050	47,000
Spain . . .	,, ...	·276	8·60	398	245	2,300	51,000
Roumania .	Mannlicher . . .	·256	8·48	347	162	2,400	48·000
United States	Lee-Straight-Pull	·236	8·50	311·4	112	2,550	—

Up to the commencement of the present war, British experts, when enumerating the principal qualities of military rifles, were in the habit of ranking them in the following order: Long range, flatness of trajectory, accuracy, rapidity of fire, and penetration; placing the weight of the rifle and of its ammunition rather in the background. In two respects, at least, the experiences of the last three months have reversed the relative importance of the above qualities, as will be shown when we reach each detail.

For our purpose we can consider long range and trajectory at one and at the same time, for though not in strict accordance with scientific demands, the necessity of making my remarks understood by the ordinary reader who has not read up ballistics, must excuse the course I propose to pursue.

Trajectory, as every one will know, is the curve described by the bullet between the muzzle of the rifle and the point where it strikes the ground or the object aimed at. A flat trajectory is important for three reasons: it ensures within certain limits, which it is unnecessary to enumerate, a long range. It ensures a wider death-dealing belt or zone of danger, for not only is there greater probability

(1) The Lee-Enfield, which is the newer type of the Service rifle, is two ounces heavier.

of hitting by direct fire an object of given height, but a bullet, having a flat trajectory, after striking the ground at a less angle than one having a high trajectory,will probably ricochet further, and have thus more chances of hitting an enemy. And thirdly, and most importantly, a flat trajectory is desirable because mistakes in judging distances do not militate to the same important extent against success in hitting the object aimed at. One example will make this plain. Say Tommy wants to hit an enemy who is, he thinks, 1,000 yards from him, but who really is only 900 yards off. Mistakes of under or over estimating distances by 100 yards, even the most expert marksman in the world will constantly make at ranges beyond 700 or 800 yards. And the British soldier, it must not be forgotten, is particularly apt to make far worse errors in this respect, for the instruction he receives in judging distances is far inferior to that which is insisted upon in all the Continental armies. Were he to be armed with the Martini-Henry, with its muzzle velocity of only 1,300 feet per second against 2,000 feet of the present Service rifle, he would over-shoot his mark by more than 21 feet. With the Lee-Metford, on the other hand, which, as one result of the greater muzzle velocity, has a much flatter trajectory, the bullet would pass not more than 11 feet over the point aimed at. This elementary illustration will demonstrate how important it is in war that rifles should have as flat a trajectory as possible, with due regard to certain ballistic laws which we cannot pursue to their somewhat intricate end in these pages.

A glance at the table will show that our Lee-Metford's muzzle velocity is inferior, in two cases, by a good deal to that of the four types named, and hence that, under given circumstances, its trajectory is also inferior in the proportion of the relative muzzle velocity. There is, it is true, another technical consideration in connection with muzzle velocity, and that is the "military merit" of the bullet. About this, experts are by no means at one, and while some claim that our ·303 bullet is, in this respect, as good, or nearly as good, as that of other rifles; others again, and these experts of perhaps greater experience, deny this equality, and by their veto of it have caused preference to be given to smaller calibres that ensure greater velocity and a better trajectory. The next quality in the order of their relative importance is accuracy. Taking as granted that the aim of the persons firing the rifles under comparison be equally efficient, it is, nevertheless, difficult to compare them, for accuracy depends not only upon the rifle itself and its ammunition, but also upon external conditions. Rifles should, therefore, be tested under precisely similar circumstances, which is obviously not easy. There is a technical process known as "ascertaining the mean absolute deviation" or "figure of merit," as it is called in this country, but there is a lack of statistical figures respecting foreign rifles that makes it

impossible to draw reliable parallels. Leaving these technical intricacies out of question, it goes without saying that to make a rifle shoot accurately it must be properly sighted, and this with the same ammunition with which the soldier is expected to fire in war. Now, aside of the alleged irregular qualities of our Cordite powder, which, were they as injurious as many experts testify, would make good shooting an impossible feat, there is no doubt whatsoever about the fact that a great number of our Service rifles now in Africa are badly sighted. So much so that 250,000 new sights, it is said, have been sent out, the replacing of which means more than appears on the face.

In this country very much less attention than elsewhere is paid to everything appertaining to shooting, and amongst these sins of omission must be placed the negligent way in which military rifles are sighted. This is done *en bloc* from machine rests, which test, it is well known, gives quite different results to those obtained when the rifle is fired by an individual from the shoulder or lying down. In the principal Continental armies, with the internal management of which I happen to be acquainted, each rifle after it has been sighted and tested in the factory is again tested by two different officials. The last test is a particularly rigorous one, for the *Compagnie Commandant*, or Captain, has resting upon his shoulders the full responsibility for the marksmanship of his company. Thus, if for any reason whatsoever his men fail to reach a prescribed fairly high standard, his promotion suffers. In the face of such severe penalties it can be imagined that badly-sighted rifles are never put into the hands of the private, and such disclosures as we recently heard of are impossible occurrences in any other large army.[1]

Rapidity of fire comes next. It is safe to say, however, that the present war has illustrated, on many occasions, that on the part of defending forces rapidity of fire is to-day of greater importance than ever. The bravest assaults have been repulsed and great loss inflicted by a well-sustained magazine-rifle fire by a numerically inferior force. In this now so important detail our Service rifle is lamentably behind those in the hands of the Boers, for it is practically not a magazine rifle at all, but a single loader, hardly superior in this respect to the long-discarded Martini-Henry. To realise the seriousness of this defect it must be remembered that when once Tommy has emptied his magazine, which he usually does long before the critical moment, it can be re-charged only by placing the cartridges *singly* into the slot, while the Boer can re-load his by a single movement of his hand, the five cartridges being held together by a metal clip, varying slightly in shape in the different rifles. Being a

(1) As a matter of fact, other military rifles have better sights than our rifle has, and I have heard many of our marksmen declare that the Martini-Henry sights were better than the present ones.

larger object to handle than a single cartridge, it is obvious that there is less fumbling about of unsteady hands when *replacing at one move five cartridges than there is in placing a single one in the gun.*

It follows, therefore, that to keep up a continuous fire at critical moments our soldier's rifle (when once his magazine is emptied) takes about four times as long to fire, say 80 or 100 shots. This does not take into consideration the effect of excitement on men when under fire, when single cartridges are easily dropped, much in the same way that in the old days of muzzle-loaders many a rifle picked up on battlefields was found to have several charges rammed down one over the other. The simplification in the loading mechanism is, therefore, a vital detail which is tested only by actual warfare. Experience to what extent a battle affects the nerve of the soldier should therefore speak the last word in peace-time tests of military arms. In this respect I think our authorities have failed to a lamentable extent, and the British officers and other experts I have consulted on this point state that it is a fact that there have been at least three important occasions when the repulses we sustained would have been almost certainly victories, had the Boers been armed with our Service rifle, for with it they could not have kept up the sustained deadly fire which made our ranks waver and then retreat. How and why this "severely criticised hybrid magazine," as Greener calls it, was ever adopted, is one of the things upon which it is desirable that light should be thrown by a thorough investigation.[1]

Of penetration it is not necessary to say much, all military rifles have sufficient penetration for practical purposes, so that the relative degree is of little importance, and the muzzle velocity is, broadly speaking, a sufficiently accurate indication.

For tactical purposes, the weight of a rifle and its ammunition has to-day enhanced importance, for the present war is demonstrating the value of mobility. Upon this military factor, every additional ounce in the equipment of a soldier has obviously direct influence. From my table the reader can see that the marching capacity of our troops is more or less handicapped by the greater weight of our rifle. It is more than 13½ ounces heavier than the German Mauser, and nearly as much in excess of the Mannlicher and the United States Navy rifle.

(1) Of the five great Continental Powers the French army is trained to shoot fastest, for the Frenchman, by dint of incessant practice (with the barrack rifle at first) has to fire and score a certain percentage of hits at the rate of nine shots in thirty seconds. The next is the Italian army, where the soldier is trained to fire twenty-five shots in two minutes. The other armies lay less stress on uniform rapidity of fire, for they create three classes of marksmanship, and thus adhere to the sharpshooter principle, viz., that some men can never be taught to shoot as well as others can with even less training. As in Continental armies every Captain knows which of his men are the best shots, for the prescribed *daily* rifle drill makes him fully acquainted with each man's shooting capacities, it is easy for him to pick out, should occasion arise, the best marksmen in his company, even without consulting the badges these men wear.

And not only is our rifle heavier than any other, but the ammunition shares the same defect. The Service cartridge weighs 125 grains more than the ·236 United States Navy cartridge, and about 90 grains heavier than the Mannlicher. This, in itself, very insignificant excess, sums up when the full complement is considered. As a matter of fact, most of the foreign infantry carry considerably more ammunition on their person than does Tommy, who is burdened with 100 rounds. Thus the German, Russian, and French carry 120, the Swiss, Dutch, and Turkish 150, the Italian 162, the United States Navy 180, while the soldier armed with the Roumanian Mannlicher carries just double the number our men do when going on active service.

Some other minor defects of the Service rifle cannot be passed over. Among these the absurdly heavy straight-pull trigger is the one which affects shoulder shooting more than any other. As I have reverted to this defect and to its remedy (long adopted by other armies) in these pages last month, I need not take up space by what would be a mere repetition. Another defect which is emphasized by rapid changes in temperature such as our troops are exposed to in South Africa, is the inferior rigidity of the woodwork of the rifle. This is caused by being in two instead of in one piece, as in all other military rifles except the French. Joints become loose, putting the sights out of alignment, even in such moderate heat as a July day at Bisley inflicts, and I have heard numerous complaints on this point.

A structural defect is the much weaker bolt of the ·303 action. This fault can become a dangerous fault when defective Cordite ammunition is used, for, in that case, as was proved at Bisley and elsewhere last July, the bolt gives way behind the too great pressure, and the "blow-back" which ensues endangers the life of the man firing the rifle. As Cordite, according to some experts, is unduly affected by heat, which is said to increase to an abnormal degree the explosive forces of this powder, serious risks are run.

This brings us to the Service ammunition, concerning which subject even harsher strictures have, I fear, to be passed than upon the rifle. The most "thick-and-thin" partisan of the War Office cannot deny that at least one large issue, amounting to some hundred million of cartridges, did develop dangerous qualities. This was the notorious Mark IV. ammunition, which came to such a deplorable fiasco at Bisley last July, when the Council of the National Rifle Association had to peremptorily withdraw it from use after the first day's trial, an officer's life, endangered by a bad "blow-back," being saved by a miracle.

It is hardly credible that, in spite of its proved and admitted defectiveness, this very Mark IV. ammunition is now being served out for practice, the official notice stating that the Government pro-

poses to use up the stock of 100,000,000 in this way. Such false economy is almost criminal.

The general reader, to whom many of the facts I have related will probably be news and unwelcome at that, will perhaps shake his head and demand better proof of their truth than is the word of an unknown civilian, though he may have fired many thousand rounds out of the rifles dealt with. Let me, therefore, add the following facts in substantiation of opinions voiced in these pages, and for this purpose I would refer him to the *Report of the National Rifle Association* for 1899. British marksmen, I need hardly say, do not, as a rule, patronise foreign-made arms or ammunition without very good reason for so doing. Hence the fact that of the twenty-four rifles that were used last year by the three teams that shot for the great event of the year, *i.e.*, the Elcho Shield, twenty were ·256 Mannlichers of Austrian manufacture. At the "Martin Smith" contest, which is generally considered the best test of all, twelve of the fifteen prize-winners shot with it, while in some of the other competitions open to other than the British Service rifle, seven out of eight, nine out of twelve, four out of five, thirteen out of fifteen of the prize-winners, who, of course, represented the picked shots of Britain, used that or other foreign-made rifles, the Mannlicher alone making fourteen top scores against four obtained by British rifles. No better proof of what practical experts think of these "made in Germany" rifles could possibly be adduced.

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As an epitome of the foregoing criticisms I challenge contradiction of the following facts concerning our Service rifle and its ammunition, when compared with the four types I have enumerated. It has the lowest muzzle velocity, worst trajectory, least penetration, by a long way the slowest fire when once the magazine is emptied, weakest breech bolt, least rigid woodwork, worst trigger-pull, and worst sights even when they are properly aligned. It is the heaviest rifle, and its ammunition shares the same defect. The latter is not always reliable, and certain issues are dangerous, as experience has shown. And least, but not last, our Service rifle is by far the most expensive of any Service arm in the world.[1]

If a war with a peasant people in the interior of Africa—the back woodsmen of that Continent—has disclosed to us very radical defects in our army administration, to what abyss shall not we be brought by a really serious war with one or more first-class Powers, such as we may have to face any day?

W. A. Baillie-Grohman.

(1) I am informed that our Service rifle costs fifty per cent. more than the Mauser 1888 model, and have no reason to doubt the truth of this statement.