‘Old Steady Shots’
The Martini-Henry Rifle, Rates of Fire and Effectiveness in the Anglo Zulu War

By Ian Knight

It is generally accepted by most historians of weapon systems that the Martini-Henry rifle, carried by all regular infantry battalions in Zululand in 1879, was one of the most efficient weapons of the nineteenth-century. It was robust, accurate and simple to use, and while it was undoubtedly prone to over-heating during bouts of extended firing, most of the problems that ensued were attributable to the ammunition it employed, rather than the rifle itself.

Indeed, the weapon is still a firm favourite with gun collectors and shooters today. In ideal conditions – lying prone on a range, with ammunition laid out beforehand – the modern marksmen might hope to achieve a rate of fire of 20 aimed rounds in a single minute, with a hit rate as high as 80% on a target 200 yards away. Such is the regard with which the rifle is held that it has influenced many of the debates concerning the battle of Isandlwana. In particular, the optimum rate of fire has often been used to support the theory that the 24th Regiment must have run out of ammunition during the battle, and that this was a crucial element in the British defeat. If the Martini-Henry was so rapid and so accurate, runs the argument, then surely the only way in which the Zulus could have penetrated the zone of British fire was by some failure on the part of that fire.

In fact, such conclusions are based on profound misunderstandings of not only the capabilities of the Martini-Henry itself, but of British tactical doctrine in the 1870s, and of the reality of battlefield experience. Conditions in the field were so unlike ideal conditions on the range that the two are largely incomparable.

The Martini-Henry was introduced into the British Army from 1876, replacing the Snider. The Martini-Henry was in fact the first purpose-built breach-loader to be issued throughout the Army; the Snider was essentially a hybrid, being a conversion of the old muzzle-loading Enfield rifle. The regulations for training troops in the use of their weapons were laid out by the War Office in a published manual of Musketry Instruction. Prior to the Anglo-Zulu War, the last Musketry Instruction manual had been published in 1874, with the result that troops fighting in 1879 had been trained according to principles which had evolved with the Snider in mind. A new edition of the Musketry Instruction manual was published in 1879 that amended some aspects in the light of practical experience in the field with the Martini-Henry. All of the troops who fought in Zululand would have been trained according to earlier editions, however. Subsequent editions of the manual added greater detail on training techniques, and embodied aims and objectives that were the result of experiences in the field across the period of the Anglo-Zulu War.

These manuals come as something of a surprise to anyone inexperienced in the use of weapons in the field. So far from encouraging a rapid rate of fire, their emphasis is upon slow, controlled and accurate fire. As a result, the actual practices employed at Isandlwana and elsewhere, coupled with the reality of combat situations, produce strikingly lower rates of fire than has often been supposed. The implications, in terms of both ammunition expenditure and casualty expectations, are of the greatest significance.

The 1884 edition of the Field Exercise Manual – which described how troops should deploy and fight at tactical level – summed up the mechanics of infantry fire as it prevailed throughout the period in which the Martini-Henry was employed. Its instructions begin with a stern warning that sets the tone for of its theoretical approach;

> In action Musketry Fire is the main element. It cannot be left to individual initiation without its degenerating into a useless expenditure of ammunition.
> The duty of directing the musketry falls on the company commanders in the fighting line; that of regulating the fire, on the section commanders, under the direction of the company commanders.
>
> The Captain points out the objectives to be attacked, and the nature of the fire to be employed. He directs the general advance of his company towards the particular point to be reached, leaving the section commanders the necessary initiative in carrying out his orders. He carefully watches the direction of the fire of the various sections, and endeavours to keep it under control so long as control is possible.

> The Section Commander, having pointed out the portion of the object on which the sections should aim, will name the distances for which elevation is to be used, the number of rounds to be fired, and the description of fire.
>
> The direction and control of fire requires, on the part of the company and section commanders, calmness and decision, skill in judging distance, a quick perception in estimating the importance of various objectives, together with a complete knowledge of the advantages and disadvantages of the varying formation of the ground, and of the curve of the trajectory of the rifle at the different ranges.

There were two types of fire employed by British infantry in action, volley fire and independent fire. Volley fire – in which a group of men, usually a section or a number of sections – fire at the same time at a given target was best used against an enemy en masse. Although the constraints of the manoeuvre mitigated against individual accuracy, volleys had a devastating psychological effect on the target, which was often as damaging as the actual casualties they caused. The sudden crash of the volley created the impression in the minds of those on the receiving end that it was more destructive than it actually was, and this in itself often caused attacks to falter. Independent fire – in which the soldier picked his own target and fired when ready – often caused more casualties, but among nervous soldiers could lead to a much higher rate of fire with a greater degree of wastage.

It is interesting to note that in the 1874 regulations, the soldier was required to load his rifle on the command 'ready', and on the command 'present' was to bring it to the aim, pause for a time equal to three beats of slow time – to steady himself – and then fire. No word 'fire' was given. If the situation changed during those crucial seconds, if the target was moving into cover, for example, the soldier was still expected to fire, and the effectiveness of his shot could be greatly reduced. From July 1879 – presumably as a result of experiences in Zululand – Army orders added the command 'fire', and this was incorporated into the 1882 edition of the Field Exercises. This allowed those directing the fire to select the most opportune moment to actually fire, and to relieve individual soldiers of the obligation of firing by rote.

Throughout this period, the emphasis in British tactical doctrine was upon producing a rate of effective fire. By carefully pacing the rate of fire, commanders stood a far better chance of achieving their tactical objectives through a higher rate of hits. In the heat of battle, a natural nervousness encourages soldiers to fire as quickly as possible in the hope that this will discourage an enemy attack. Under such circumstances, aimed fire can soon be abandoned, and changes in the formation and distance of the target can be overlooked, so that the exact opposite of the desired effect can occur. By blazing away rapidly, the troops might cause fewer enemy casualties, and encourage rather than discourage attacks. Moreover, it has been noted on a number of occasions that the black powder charge of the Boxer cartridges employed with the Martini-Henry rifle produced a large quantity of dense white smoke when expended. This was particularly true when volley fire was used in close formations. On a still day, one or two volleys would be sufficient to obscure the target, and any subsequent volleys, if not properly controlled, would be fired blind. One reason for slowing the rate of fire was therefore to allow the smoke to clear. It also allowed officers to see the effect of their fire, and to change targets or adjust ranges if necessary.

The general principle embodied in British military practise was therefore that slow fire was more likely to be effective fire.

Sadly, there are no references in the training manuals of the late 1870s as to the rate of fire that was expected of infantry companies in the field. However, the Musketry Instruction manual for 1887 – when the Martini-Henry was still in use – offers some rates of fire for field practices that are deeply revealing. These rates were a reflection of what the rifle might achieve under ideal conditions. So far from the 18 or 20 rounds of modern myth, it was noted that,

> One minute will be allowed for each of five volleys, counting from the first command 'Ready' ... It should distinctly be understood that the section commander is under no obligation to fire five volleys; on the contrary, it would be wiser to fire only four volleys if he thinks the results would be better.

Even field training days would ideal compared to battlefield conditions, where realistic rates of fire, against a moving target, were probably no better than 2-3 rounds at extreme range by volley, and 4-5 rounds and closer ranges. Independent fire might be as high as 6-7 rounds and 9-10 rounds respectively.

As to effectiveness, the 1884 Field Exercise manual stated the ranges at which a trained soldier might be expected to hit the target 'without wasting ammunition';

> At 200 yards, a man partly sheltered or lying down.
>
> At 300 yards, a man standing or kneeling.
>
> At 450 yards, a mounted man.
>
> At 500 yards, fire may be opened on a thin line of skirmishers, with intervals of about 5 paces between each man.
>
> At 600 yards, on a thicker line with 3 paces intervals.
>
> At 800 yards, on skirmishers with less interval, or on a company at 'open files'.

The same manual advocated fire on targets of varying degrees of density up to 1,400 yards, where it might cause damage 'on Battalion Columns and on compact bodies of Artillery or Cavalry'.

If these rates of fire and effectiveness were expected of British troops in training in 1879, how viable were they in the field? One reason why officers were particularly keen to control the pace of fire of their men was a realistic appreciation of how inexperienced some of them might be in action. This was particularly true of the later stages of the Anglo-Zulu War, when battalions of reinforcements rushed out to Zululand were brought up to strength with recruits, some of whom had not completed their basic musketry training. In any case, the perennial War Office worry about expense meant that many troops being despatched to the field had fired only a handful of rounds in practise. Some fired more rounds in their first action than they had in several years of peacetime manoeuvres. As Major Bindon Blood put it,

> Thus it came about that our battalions landed in Zululand full of incompletely trained men, a great proportion of whom had never fired a round of ball cartridge, while many had never fired a round of blank, before they embarked. I put it thus because great trouble was taken on the voyage in the instruction of the recruits on board the transports, so that in the harbour of St Vincent for instance, where our ship anchored for about twenty-four hours, the bullets were frequently heard singing somewhat unduly near our ears! And the same thing happened also at Simon's Bay ... (1)

The results, when the reinforcements found themselves in action for the first time, were predictable, and were a salutary lesson to their officers on the importance of maintaining strict fire control. At Gingindlovu, Captain Hutton of the 60th Rifles commented pertinently that

> After the first volley, which could hardly have been expected to have done much execution, since there were but a number of darting figures at irregular intervals to aim at, I ordered my men to go on firing very steadily. A few showed signs of firing wildly, but a smart rap with my stick soon helped a man recover his self-possession . (2)

Even so, John Dunn, the professional hunter and 'white Zulu' who accompanied the British force as an intelligence officer, thought the standard of firing very poor. He noted that their officers failed to order them to adjust their sights as the range closed, and he 'was much disappointed at the shooting of the soldiers. Their sole object seemed to be to get rid of ammunition or firing as many rounds per minute at anything, it didn't matter what'. (3)

By contrast, it should be noted that the 24th at Isandlwana were, in Smith-Dorrien's memorable phrase, 'no boy recruits, but war-worn matured men, mostly with beards, and fresh from a long campaign in the old colony where they had carried everything before them'. (4) As Frere had put it, they were 'old, steady shots', who were well used to their weapons, and had used them in action on several occasions before. Nevertheless, it is significant that their officers were still exercising strict fire control; the survivor, Captain Essex, recalled that in the opening stages of the action, he assisted Lt Cavaye in pointing out targets to the men, and urging them not to waste ammunition. Clearly they were placing their shots carefully, since Essex observed that they 'were as cheery as possible, making remarks to one another about their shooting. (5) Smith-Dorrien thought that 'they lay on their position making every round tell'.

If the 24th were firing slowly and carefully, then, how many shots did they fire during the battle? Clearly, this is crucial to any calculation regarding ammunition expenditure, but the answer will never be known. We simply do not know when individual companies opened fire, and for how long they fired continuously. Tempting as it is to imagine that the 24th opened fire the moment the Zulus appeared, and fired at a consistent rate throughout the battle, this simply would not have happened. As the evidence above indicates, officers exercising good fire control would have directed the men to fire at the best targets; with the Zulus moving rapidly, and making good use of cover, there would inevitably have been times when they were obscured. Individual companies probably ceased firing for several minutes at a time, as circumstances changed about them. When Mostyn and Cavaye's companies first opened fire on the Zulu right horn, it was at long range, and the rate of fire would have been moderate or even slow - the need to place shots was more important than the need to pour in the volume of fire necessary to break up an imminent attack. Moreover, any movement among the companies themselves obviously led to a break in firing. Essex thought that Mostyn's company had only been in action on the ridge for about five minutes – and Cavaye's, by implication, rather longer – when it was ordered to withdraw to the foot of the heights. Contemporary estimates of time are notoriously unreliable, especially in a battle like Isandlwana when the trauma of subsequent events serves to confuse the memory, and on balance it seems likely from other sources that Mostyn and Cavaye were in action on the heights for rather longer. Nevertheless, it is worth noting that Essex says these companies were running low on ammunition by the time they reached the bottom of the ridge, and that he was prompted to organise a re-supply. Certainly, if they had been in action for twenty minutes, firing an average of two rounds a minute – not an improbable rate, given the factors already mentioned - they would have used up rather more than half the rounds with which they had begun the battle.(6)

It should be noted, however, that the actual expenditure in battle was usually surprisingly low. The optimum rates quoted in the manual were only desirable during the last stages of a determined attack, when it was necessary to break up a charge before it struck home. When firing at longer ranges, a slower rate of fire was distinctly preferable. At Gingindlovu – where the fire was less disciplined and therefore more rapid than at Isandlwana – Captain Hutton observed that 'the average number of rounds fired per man was rather under seven; that of the marines next to me was sixteen'. In his autobiography, Evelyn Wood noted that at Khambula – a battle where the intensity of the Zulu attack arguably matched that at Isandlwana – 'the Line Battalions were very steady, expending in four hours an average of 33 rounds per man'.(7) At Ulundi, the average was 10 rounds expended in half an hour. Colonel C.E. Callwell, in his wide-ranging review of colonial warfare first published in 1896, provides a number of examples of rates of fire with Martini-Henry rifles from outside the Zulu campaign. At the battle of Charasia, in the 2nd Afghan War, 'the 72nd fired 30 rounds a man, being heavily engaged for some hours'. (8) At Ahmed Khel it was only 10 rounds per man, while at El Teb and Tamai in the Sudan – both battles in which the enemy launched extremely determined attacks – 'the troops most committed fired about 50 rounds a man'. By contrast, French troops at the battle of Achupa in Dahomey fired about 80 rounds a man in two hours, using a magazine rifle with a much faster rate of fire – a statistic that Callwell considered 'remarkable'.

These steady rates of fire were the product of the deliberate policy encouraged by official training manuals, where slow fire was regarded as effective fire. At Ulundi, the war correspondent Melton Prior noted with some disdain that Lord Chelmsford met a particularly determined Zulu attack with the order 'Men, fire faster; can't you fire faster?' and contrasted this with Sir Garnet Wolseley's maxim 'fire slow, fire slow'. (9) The measured volleys of the 24th at Isandlwana can be compared favourably to the experience of Private Williams of the 1/24th, Col. Glyn's groom. Williams was in the camp at Isandlwana as the Zulu attack developed, and together with several officers' servants, began to fire from the edge of the tent area at the distant Zulus. This was independent fire, with no one to direct it, and Williams noted that 'we fired 40 to 50 rounds each when the Native Contingent fell back on the camp and one of their officers pointed out to me that the enemy were entering the right of the camp. We then went to the right ... and fired away the remainder of our ammunition'. (10) Note, however, that even under these conditions, Williams' 70 rounds lasted him throughout most of the battle.

Before leaving the question of the effectiveness of Martini-Henry fire at Isandlwana, it is worth noting that Smith-Dorrien's comment that the 24th were 'making every round tell' should be taken as a tribute to their reliability rather than at face value. This is particularly important, because an unrealistic assessment of the potential destructiveness of rifles on the battlefield can distort our reading of events. Clearly, if the 24th did indeed hit their targets with every shot, the 600-odd men of the 24th in the firing line would have killed the entire Zulu army in 34 volleys! In battles across history – the more so in recent times, with modern rapid-fire weapons – the ratio of shots to hits is always

high. The level of accuracy expected on the firing range was not attainable in the field, where even the strongest nerves could be unsettled by the tension of battle, and where the enemy was not only a moving target, but firing back. At Isandlwana, the Zulu attack was carried out in open order, making good use of the ground, and the warriors only drew together during the final rush. When caught in the open, the 24th's volleys were devastatingly effective, but the Zulus naturally sought to avoid this situation. It is no coincidence that the attack of the Zulu centre stalled when it reached the protection of the dongas at the foot of the iNyoni ridge. Having found cover under heavy fire at close range, the warriors found it difficult to regain the impetus of their attack, and mount an assault up an open slope into the teeth of the 24th's fire. It has been estimated that at long ranges (700-1400 yards) volley fire was no more than 2 % effective. At medium range (300 – 700 yards) it might rise to 5% effectiveness, and at close range (100 – 300 yards) 15% effectiveness.(11) Given the amount of smoke produced by close-range fighting in any battle, and the effects of adrenaline generated by the proximity of the enemy, even that figure might be optimistic. It's interesting to note that at Gingindlovu, if Hutton's estimate of the number of rounds fired by the 60th Rifles is correct, then 540 men fired over 5000 rounds; he noted afterwards the just 61 dead were found within 500 yards of their line, in the most destructive fire-zone. Although more undoubtedly fell at longer ranges, and an incalculable number were wounded – several times the number killed - this figure suggests a ratio of 80 shots to kill one Zulu. At Khambula, using Wood's figure as a basis, some 1200 infantry fired nearly 40,000 rounds of ammunition, killing up to 2000 Zulus – a rather better ratio of 20;1, reflecting the greater experience of the battalions involved. In both cases, numbers of the enemy were killed by artillery fire, and many more in the pursuit, so the proportion of kills attributed to the infantry should be further adjusted downward. Taking the war as a whole, it probably took between 30 and 40 shots on average to kill one Zulu, although a number of those shots might have inflicted wounds and incapacitated the victims.

And therein lies an important truth about the effectiveness of battlefield fire. Killing the enemy was not the sole objective. Discouraging his attacks, breaking up his formations, and causing him to retire were the tactical necessities, and it was necessary to kill only a small proportion of the enemy involved to achieve them. To withstand prolonged and accurate Martini-Henry fire was a terrifying experience that even the bravest warrior could not endure indefinitely. It inevitably sapped morale, and led to a growing reluctance to maintain an attack. As Hutton noted at Gingindlovu, heavy fire could drive off an attack even when the number of casualties was relatively low, simply because it created an impression of impenetrability. 'After a short while', he wrote, 'the enemy, unable to make any headway against our fire, gradually withdrew'. This effect tended to be cumulative; at Isandlwana, the Zulu army, still fresh with enthusiasm to defeat the invader and confident of victory, was prepared to endue the 24th's fire to a remarkable degree. Later, however, when the cost of the victory became apparent, there was a growing reluctance to face the fire on quite the same terms, so that by the time of the battle of Ulundi, some British observers noted that the Zulu attacks sometimes faltered and hung back. Certainly, at that battle, several Zulu veterans recalled that the noise and concussion of British fire at close range was in itself awe-inspiring.

Perhaps the most famous example of the fire being effective without being unduly destructive is at Rorke's Drift. Here the defenders fired off nearly 20,000 rounds in ten hours, killing some 600 Zulus – an average rate of fire of rather less than 15 rounds per man per hour, with a kill ratio of 33:1. The circumstances here are of the greatest importance, of course; after the initial attacks were met by volley firing, most of the fire would have been independent fire, at ranges so close that they effectively constituted hand-to-hand combat, or directed against an enemy concealed by natural cover. Moreover, much of that firing would have taken place with the bayonet fixed – which seriously affected accuracy – and in circumstances where careful aiming was difficult. After two or three hours, night fell and all firing was carried out in the dark, lit at best by the flames of the burning hospital. Under such circumstances, the low rate of kills to shots is not surprising, but the British fire could hardly be considered ineffective. On the contrary, it was particularly effective in its primary objective after dark – that of suppressing the enemy, and discouraging his attacks. Every time Zulu chants or shouts of command suggested that an attack was imminent, the defenders poured fire in that direction. Although the number of hits was undoubtedly minimal, it was often sufficient, by that stage of the battle, to prevent the attack from developing.

In the final analysis, a realistic appreciation of the battlefield capabilities of the Martini-Henry, and the tactical doctrines, which underpinned its use, is essential to any analysis of the events of 1879. Yet if the rate of fire was much slower, and its destructiveness much less, than popular myth suggests, it should be remembered that it was still a highly effective weapon that was greatly admired by the men who used it. As Hutton put it, 'we all had the utmost confidence in our rifles, which were at that time the most perfect weapons in the world'.

Acknowledgement.

My thanks to Adrian Whiting, the Armourer of the Die-Hards re-enactment group, and a keen Martini-Henry shooter, for helping to disentangle the various relevant training manuals, and for allowing me some practical experience of the weapon.

References.

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3. Dunn's account *The Red Soldier*.
4. Smith-Dorrien. Horrace *Memories of Forty Eight Years Service* 1925
5. Essex. Letter to *TheTimes* 2 April 1879
6. 70 rounds per man; 20 in either pouch on the front of the waist belt and 30 in the black expense pouch or 'ball bag'.
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Editor's note.

I recently came across this interesting comment made by Dr. Adrian Goldsworthy in his book ***Cannae*** recently published by Cassell.

Modern studies suggest that relatively few soldiers, even in the best-trained units, actively aim at and seek to kill the enemy in combat, most firing their weapons wildly and some not even firing them at all. Certainly the ratio between the number of rounds fired and the number of casualties inflicted on the enemy in the well-documented combats of the last few centuries has been staggeringly low, usually at least several hundred to one.