RIFLE PRACTICE. By Colonel John Jacob, C. B., of the Bombay artillery.

(From the North British Review.)

"Over earnest shoting," says Roger Ascham, who, at Cambridge, taught Greek in the days of King Henry VIII,, "surely I will not over earnestly defend, for I ever thought shooting should be a waiter upon learning, not a mistress over learning.

"Yet this I marvel not a little at that ye think a man with a bow on his back is more like Robin Hood's servant than Apollo's seeing that Apollo *himself, in Alcestis of Euripides*, in a manner glorifieth, reaping this verse—

'It is my wond always my bow with me to bear.'

Therefore, a learned man ought not too much to be ashamed to bear that sometimes which Apollo, god of learning himself was not ashamed always to bear. And, because ye would have a man wait upon the Muses, and not at meddle with shooting, I marvel, that ye do not remenber how that the nine Muses themselves, as soon as they were born, were nurse to a lady called Euphemis, which had a son named Erotus, and whom the nine Muses, for his excellent shooting, kept evermore company withal, and used daily to shoot together in the Mount Parnassus; and at last it chanced this Erotus to die, whose death the Muses lamented greatly, and fell all upon their knees before Jupiter, their father, and at their request, Erotus, for shooting with the Muses on earth, was made a sign, and called Sagittarius, in heaven. Therefore you see that if Apollo, and the Muses, either were examples indeed? or only fained of wise men to be examples of learning, honest shooting may well enough be companion with honest study.?'

So says honest Roger ascham, who also praises shooting in the following terms:—

"Therefore, to look on all pastimes and exercises, wholesome for the body? pleasant for the mind, comely for every man to do, honest for all other to look on, profitable to be set by of every man, worthy to be rebuked of by no man, fit for all ages, persons, and places, *only shooting* shall appear wherein all these commodities may be found."

"My choice," says a hold soldier of the time of Charles I., "in the day of battel, and leading a storm, or entering a breach, with a light brest-plate and a good head-piece, being seconded by good fellows, I would choose a good *half-pike* to enter with."

"Man," says Colonel John Jacob, C. B., "has been called a tool making animal and, it is certain, that the perfection of tools and machinery is a clear and certain mark of advancing civtlisation, of the progress of the rule of mind over matter, of the development and operation of these laws by which the working of the human brain makes the force of one civilised man equal that of the stalwart limbs of thousands, or even millions, of untaught and ignorant barbarians.

"If such the value of the tools employed in the arts of peace, those used in war must be even of greater importance. On success in war often depends the power to follow peaceful pursuits; on the high state of the art of war, the practice of all other arts may depend."

"Whatever state," says the clear headed Robins, writing a hundred and ten years since, "shall thoroughly comprehend the nature and advantages of rifle pieces, and having facilitated and completed their construction, shall introduce into their armies their general use, with a dexterity in the management of them, will by this means acquire a superiority which will almost equal anything that has been done at any time by the particular excellence of any one kind of arms, and will, perhaps, fall but little short of the wonderful effects which histories relate to have been formerly produced by the first inventors of firearms."

"The nation," says a writer af the present day "that takes thoroughly to the rifle is impregnable."

To national impregnability, which means national independence, they are three military requisites: the first, the weapon that shoots far; the second, the half pike, or short spear, for the close thrust; the third, the union of these two into a single weapon. That weapon is the *rifle*. The rifle, with its bayonet, with no man can handle like the British man, is, in fact, the symbol of the national union which made a United Kingdom out of two independent monarchies. The bow was the national weapon of England, the spear the national weapon to Scotland. The two combined in the bayoneted firearm; and the bayoneted firearm is now the rifle, which, without a shadow of doubt, is the most powerful and most practical weapon ever placed in the hands of a soldier.

On the present occasion, therefore, we propose to offer a few cursory observations on rifles, neither scientific nor historical—though both might be interesting in their way—but actual. We shall inquire neither into expansions nor contractions, angles nor curves, parabolic hypothesis nor alarming mathematic symbols, which hitherto have not shed much greater light on the practice of rifle-shooting than they did on the cognate problem of ship-building. Nor shall we ask when the long-bow, which, with its clothyard shaft, has such a marvellous of battles fought and won, first came into use in England; whether it be to the East, and came with the Norman, who—we have a theory—was of Eastern origin; nor how it fell into the hands of the English Saxon; nor of the English bowman, who was known? as some say, at the distance of a mile, by the size of his great right arm, was the Saxon Englishman, and won the battles of England, while the Norman still sat on horseback and handled sword and spear. Nor struggling for the mastery, till they came into a union, even though Colonel Jacob revives the memory, and tells us that, "as Flodden, even men naturally equal to ours would be absolutely powerless before skilful English soldiers so armed (with the rifle), and trained both to independenr and combined action." Nor need we point out to the gallant Colonel that he should have taken Falkirk rather than Flodden, for it was there that the Chiltrons, with their eighteen feet long spears, were shot down where they stood by the English arrows; or how, at a later battle, not far from Stirling, all the chivalry of England surged uselessly against the spears, and the archers being by "Schyr Robert of Keyth stekand dispitously," and "scalyt ever ilk ane," the spear of defence routed, for the time, the bow of attack, and founded a long historic story, that finished at last "like the end of an old song." Into science or lore we enter not save cursorily—we wish to know that the rifle in the present day, and what it can do, Colonel Jacob shall tell us.

To enable the uninitiated reader to understand the advance made by the rifle, in its recent form, over the old smooth bored musket, which was the ordiuary weapon of our infantry down to the year 1852; and over the rifle, which was practically used in the service down to the same period, we may state broadly, that the fire of the musket was not usually considered of avail beyond the distance of 250 yards—or say, at the outside, 300 yards. Of course, the range or distance to which the ball could be driven was much greater, but the weapon failed in accuracy; no one could tell where the bullets would go to. Nor were the rifles very much better—as they were used. The two grooved rifle in the service in 1852, called the Brunswick rifle, shot so inaccurately at 500 yards, that no angle of elevation could be assigned for that distance. The great fault in that case was in a shape of the bullet. With a properly shaped bullet the same piece would certainly have ranged upwards of 1000 yards, with considerable accuracy. We must note, however, that the Buunsweck rifle was far inferior in its design to the old poly-grooved pieces, constructed for an ordinary spherical ball, and answering their purpose remarkably well at the limited range that the spherical ball can attain. We need not pretend to determine the exact date of the recent improvements, because various claimants have asserted their priority; but it is tolerably certain that down to a very recent period, 200 yards was esteemed the distance at which even an approach to accuracy could be obtained. Let us then contrast that statement with the following:—

"At a distance of 700 yards, on a windy day, an experiment, requiring forty-eight rounds to be fired from different barrels' set at different angles, was made, without a single shot missing the target."

This statement is from Colonel Gordon's account of the experiments made at Enfield in 1851, but it sinks into comparative insignificance when brought into the proximity of Colonel Jacob's doings in India.

"The 24 guage balls, of the increased length of two and a half and three diameters, proved admirably effective at ranges up to 2000, yards, which had never before been attained."—(*Rifle practice*, p. 26.)

"A guage ball, of the diameters in length, with thin iron point, is perfectly effective up to ranges of 2500 yards or more."—(P. 28.)

"Regular practice a further range than 2000 yards, I have not tried; but from what I have seen of the effect at that distance, I am convinced that, with these balls which I am now using, a moderately light and perfectly handy rifle may be made to possess as much effectual power, at a distance of 3000 yards, as the old two-grooved rifle with the round ball, at 300."

It was in the year 1852 that the conclusive experiments carried on at Enfield, induced, or, it may almost be said, necessitated the introduction into the army of the government rifle, termed officially, the *new Enfield musket*. Previous to that time, the *Minie* bullet had been tried, with a certain amount of success. Its principle was to make the bullet expand by means of an iron cup, which was intended to be forced into the lead to the explosion of the powder. The object to be gained was to enable the soldier to load easily—the difficulty of forcing down the ball having been the practical objection to the rifle as previously employed. The iron cup, however, instead of being driven into the lead, was frequently driven through it—the iron cup was discharged, and the lead remained in the form of a ring in the barrel, rendering the piece more or less unserviceable. The principle was correct, but the mode of application was unsuccessful, and the iron cup disappeared from the service. The *Minie* rifle was the pattern of 1851, and the diameter of its ball, in decimals of an inch, was 702. *The Enfield* rifle, which followed the Minie, originated in the experiments made at Enfield, where the government factory is situated. Some of the most eminent English gunmakers had been invited to send in such patterns of rifles as in their estimation would be found suitable for the military service of the country. The invitation on the part of the authorities appears to have been given in good faith, and with a candid desire, not only to discover the most serviceable weapon, but to do impartial justice to all parties forwarding their guns for trial or competition. The invitation, it must be confessed, was not met by the gunmaking community with the same spirit of candour. There were reservations, alterations, and a fear that their weaknesses might be discovered; some were too late, some appeared to have sent the wrong pieces or the wrong bullets, and, on the whole, the exibition was not particularly creditable to the trade. Mr. Wilkinson formed the exception. He sent in his articles, stood to his patterns and singularly enough, the recent tendency seems rather to approach the conclusions in which Mr. Wilkinson differed from his fellow competitors. The gunmakers who forwarded rifles were, in addition to Mr. Lowell, inspector of small arms—Mr. Lancaster, Mr. Purdey, Mr. Westly Richards, Nr. Wilkinson, and Mr. Greener.

The regulation Minié was also brought into competition, and the Brunswick two-groove.

The specification of the guns was as follows, beginning with the largest bore:—

Guns.	*Bore in decimals of an inch.*
Brunswick, or two groove,	.704
Regn Minie,	.702
Purdey	.650
Lovell,	.635
Greener	.621
Richards,	.577
Lancaster,	.540
Wilkinson,	.530

Many experiments were made with these muskets; and the mode of ascertaining their respective merits, was by firing at various distances a certain number of shots from each barrel when fixed in a frame, and set to an angle of elevation, and the firing twenty shots from the same barrel, when mounted in its stock, from the shoulder af a good marksman, who fired with a rest. Every care was taken with the mechanical adjustments to make the epperiments were on the whole highly satisfactory, with one exception. There appears to have been no intelligent apprehension that the shape of the bullet might be the most inpoitant element of the whole investigation. No principle appears to have presided over this part of the inquiry. There was evidently no conception, either on the part of the gun-makers, or on the part of the officers, that the form of the projectile to be driven through the air was of imcomparably more impartance than the number of grooves by which the rotatoty motion might happen to be communicated, or the greater or less calibre which might happen to be selected. The number of grooves, provided the rifle bullet be made to spin properly, is a matter of comparative indifference. It may be two, or it may be twenty and the gun may shoot well in either case. And the size of the bore is a mere matter of convenience, the smallest bore being selected that is found fully efficient for ordinary military Service. But the shape of the bullet is the one radical and essential consideration which surpasses all the others. It is the bullet that has to move through the air, the rifle being merely the implement for communicating the motion and one of the most remarkable facts in the whole history of arms, is this very fact, that the shape of the bullet shonld have been neglected down to our own day. Even at Enfield, in 1852, there scarcely seems to have been even a gleam of suspicion that the form of the projectile must be suitable to the velocity with which it was to move, and the medium through which it was to be propelled. The very slow growth of an intelligent understanding of this point will ever remain a marvel in the history of the scientific art of gunnery. Neither officers, nor gun-makers, mathematicians, nor artillery-men, the sound practical men who trust unlimitedly to their own judgment, nor the theorists, who have an equal reliance on the infallibility of abstract truth—neither the one nor the other appear to have had the smallest real insight into the consideration which, next to that of making the rifle bullet *spin*, is virtually the crucial point of the whole matter. We shall endeavour to explain this, after describing the Enfield rifle.

After the experiments had been concluded and out of the materials which had been furnished in the course of the experiments—two rifled muskets were made at the Royal manufactory at Enfield. The whole question of designing a pattern arm being a question of the compensation of advantages, and the adjustment of proportions and degrees, the authorities in the construction of the new muskets, endeavoured to assemble the most useful and most serviceable qualities according to the results that had been brought out in the course of the trials. They produced two muskets, not exactly similar to any that had been offered for trial, but combining, to the best of their judgment, the merits that that had been before apparent. These muskets, up to 800 yards, shot better than any that had been tried tried. These were the new Enfield rifles, and their specification was as follows:—

Weight, with bayonet	9 lbs. 3 oz.
Barrel, weight,	4 lbs. 2 oz.
" length,	2 ft. 3 in.
Bore, cylindrical,	.577 in.
Grooves, three—one turn in,	6 ft. 6 in.
Charge—Powder, 2½ drachms.	
Bullett length,	.960 in.
" diameter,	.568
" weight, grains,	520

The bullet was made with a cavity at the butt to make it expand, but without an iron cup, and for this bullet, the inventor, or presumed inventor Mr. Pritchett, received, if we mistake not, a gratuity of L.1000 from Government. Since then, however, a modification has taken place. It has been found that the cupped bullets, when made small enough to load with sufficient ease for military purposes, do not expand with certainty and, consequently, do not take hold of the rifling, in which case they are projected out of the barrel without the spinning motion, and tumble "head over heels." Instead of going straight forward—or as straight as the continued action of gravity would allow—they perform extraordinary curvatures in the air, and are not particularly safe when they go astray. To remedy this defect, a plug of hard wood has been introduced into the cavity, and it seems to answer its purpose tolerably well. Snch is the rifle now employed in the service, called the Enfield Rifle, or pattern of 1853; and of this pattern, 272,000 were supplied by the private gun trade of the country, down to March 1857.

For the manufacture of this gun by machinery, so as to make the varions parts of the gun interchange and fit each other universally, the Enfield Factory has received a number of igenious machines from America.

(To be Continued.)