

We print elsewhere the papers lately set in the British tactical examinations for volunteer officers, for the sake of showing our Canadian brethren what they should know; for certainly if either force needs to be posted in tactics the want is greatest in Canada, where we have no trained regular officers to help us through in case of emergency. It is pretty safe to say that five per cent. of our officers could not pass these examinations, and the conclusion is forced upon us that we would all do well to go in for a little grinding up in the literature of the military art.

At last we have room to print the beginning of the official account of the fighting at Batoche, and it will not prove the less interesting for having been kept for a time.

The text of "The 90th on active service" has been received, and the burlesque will be noticed in a future issue.

### RIFLES AND RIFLE SHOOTING.—XVIII.

#### IV.—BY CAPTAIN HENRY F. PERLEY, HEADQUARTERS STAFF.

The following is a tabular statement of the "causes in deviation in firing," and some *one*, or a combination of *two* or more of them, must be the reason why a miss has been made:—

1. From the construction of the arm.	Causes which can be corrected.	Wrong position of sights. Calibre not exact. Barrel imperfect. Too hard on the trigger. Windage.
	Which cannot be corrected.	Recoil. Vibration of the barrel.
2.	From the charge of powder.	Not exact measure. Form of grain, and variable in quality. Deterioration from dampness. Foulness and dirtiness.
3.	From the ball.	Not being of exact weight and calibre. More or less deformed before, or on leaving the barrel. Not having centre of gravity in centre of mass.
4.	From the atmosphere.	The effects of the wind. " " temperature. " " moisture and density of the air.
		The position of the sun. Fleeting clouds. Difference of level between gun and target.

The Snider rifles, when first served out to the active force of Canada, were as perfect rifles as could be made. Taken fresh from the case a new rifle is a fine piece of workmanship, made of the best materials, and calculated to stand a great deal of bad usage; for all are acquainted with what rifles undergo during weekly drills, and the perils they have to pass through in piling arms, when some unfortunate pile not having been locked in the orthodox manner, tumbles over and upsets the neighbouring piles in rapid succession.

Private rifles, *i.e.*, those made by private makers and bearing the Government viewer's mark, and owned by individuals, are permitted to be used in all competitions; and as rifles, like everything else, wear out, it is this depreciation which originated the idea of using private rifles. Some years ago steel barrels came into use, but did not last long, as it was soon determined that better results were obtained from the soft iron barrel.

In selecting a rifle many prefer to have one possessing deep grooves, on the grounds that the bullet expanding by the explosion of the gunpowder becomes well seated, and is forced to follow the spirality, and thus to preserve its rotatory motion during flight better and more accurately than can be done by shallow grooves. Here experience has intervened and proved that deep grooves are not the best, that the bullet is liable to "strip," that is, not to take up the spirality, but to pass straight through the bore, leaving particles of lead along the edges of the lands; and also, that they clog up faster with fouling than shallow ones. General Jacob, an officer in the late East India Company's service, who spent much money and many years in experimenting with the rifle, gave as his opinion, "that the grooving should only be of a sufficient depth to ensure the rotation of the ball, and, other things remaining equal, shallow grooves give better practice than deep ones."

Of course there must be a degree of shallowness which is to be refused, but a rifle otherwise perfect should not be rejected because the grooves appear shallow. There is one thing most particular, and that is to see that the grooves at the muzzle are clear and well defined, for the direction of the ball in its flight is entirely dependent upon that

which it receives at the moment of quitting the barrel, and the rule therefore obtains never to clean your rifle with an iron rod, but to use a wooden one, or what is better than anything, the ready-made cleaner, consisting of a bullet and a piece of strong cord, wiping out from the breech up to the muzzle. Col. Wingate, in "Rifle Practice," says:—"A breech-loader should habitually be wiped out from the breech. If the breech mechanism renders this impracticable, the men should be cautioned to use special care not to mar the rifling at the muzzle in wiping, as this is the portion which, if injured, will have the greatest effect upon the accuracy of the rifle."

A diversity of opinion exists as to whether a rifle should be wiped out during a match, or whether it should be left alone until the completion of the shooting, or not wiped out at all. There are numbers who maintain that it is not necessary to wipe out at all, and that they shoot as well, if not better, with a dirty rifle, than with a clean one. It is the opinion of such that, before commencing to shoot, it is necessary to discharge a "fouling shot," whereby the barrel is, for the first shot on the score, in the same state as for the last. If this holds good for a dirty barrel, it will hold good for a clean one. General practice and experience are in favor of a clean barrel, for if a dirty one is better than a clean one, dirty barrels would probably be the order of the day, but such is not the case; and there is not the slightest doubt that, when shooting on a very bright hot day, when the fouling has a tendency to cake, the proper thing is to wipe out whenever an opportunity is afforded.

As previously stated the fouling is occasioned by the decomposition of the solid residuum left by the combustion of the gunpowder, of which the most obnoxious is the sulphide of potassium, a salt which readily absorbs moisture from the atmosphere. On a hot day the fouling does not attain the semi-fluid state usually observed in damp weather. With a foul barrel there is always a loss of power from the increased friction, and there is also inaccuracy both in direction and elevation if the fouling be so considerable as to fill the grooves, and prevent the projectile from receiving its proper rotatory motion.

There is not a doubt but the dirty state of many rifle barrels has led to the adoption of the "fad" of "blowing" either into the muzzle or into the breech after each shot, and the introduction of various styles of apparatus to convey the human breath into the interior of the barrel, the use of all of which appears to be very questionable.

During a warm day the hands become damp with perspiration, and the grasp of the rifle is in consequence not as firm as it should be, and becomes less as the barrel heats up. The use of an old leather glove on the left hand will counteract this, and by some it is held that a glove should always be used. Chequered stocks were brought into use to assist in maintaining the grasp, but the benefits arising from their use, are more fancied than real.

The sights in a rifle need not be described here. The foresight is fixed and immovable, and the elevation at the different ranges is attained by raising or lowering the bar on the leaf of the backsight. In practice very few rifles are to be found in which the graduations on the leaf give definite results, that is—the elevation of the bar for, say 500 yards, differs for all rifles, it may be to a very small amount, but still such a difference exists. These sights are all made to one pattern, and are brazed to the barrel, the only care being taken to see that they are accurately aligned with the foresight along the straight line described by the axis of the bore, and they cannot be expected to suit the exact elevations of the bar required by the individual user.

Many now use the bar reversed, properly inverted, and its use in this manner has been sanctioned by the British Government in the later issues of the Martini-Henry, and its advocates claim that when inverted it presents advantages over the V in making allowances for "wind." Thus, in shooting at 500 yards and using the V in a wind for which an allowance of 4 feet "off" has to be made, it becomes necessary to aim completely off at some convenient or imaginary object judged to be *one* foot distant from the edge of the target to ensure the chance of hitting the "bull," and it sometimes becomes a difficult matter to estimate this foot. Again, whilst aiming off, a portion of the bar beyond the V obscures the sight of the bull's eye, and the shooter in such case is left to chance in making a hit. With the "bar" this does not happen, and as the flat top can be made to act as a wind gauge by shifting the eye along the edge, sufficient allowance can be made for wind, and the aim still kept on or near the bull. The width between the sides of the flap of a Snider rifle is nearly two-tenths of an inch, or one-tenth on each side of the centre line. Now if the eye be carried along the bar nearly to the side of the flap and aim be from that point over the foresight at a point on the target under or near the bull, then there will have been an allowance made for 4 feet of wind. Again, supposing seven feet of wind has to be allowed for, then by using the sight as above described, and aiming at the edge of the target, the pro-