CONTENTS OF No. 38, VOL. VI.

The Volunteer Review,

AND

MILITARY AND NAVAL GAZETTE.

"Unbribed, unbought, our swords we draw,
To guard the Monarch, fence the Law."

OTTAWA, MONDAY, SEPTEMBER 23, 1872.

LIEUT.-COLONEL WAINEWRIGHT GRIFFITHS, at present on a tour through British Columbia, has kindly consented to act as the Agent for the VOLUNTEER REVIEW in that Province,

TO CORRESPONDENTS.—Letters addressed to either the Editor or Publisher, as well as Communications intended for publication, must, invariably, be *pre-paid*. Correspondents will also bear in mind that one end of the envelope should be left open, and in the corner the words "Printer's copy" written, and a two or five cent stamp (according to the weight of the communication) placed thereon will pay the postage.

THE calibre or bore of a piece of ordnance depends upon the form of the shot to be fired from it. A smooth bore gun will not throw an elongated shot; it will turn over in its flight, strike the object at which it is fired lengthwise, and its range will not be as great as that of a round shot from the same piece Rifling a gun has the advantage of enabling it to throw a heavier shot from a smaller calibre, thus: a 12-pounder smooth bore gun is 4·62 inches in diameter at the bore; a 12-pounder rifled piece being just 3 inches. The elongated shot will offer less resistance to the air, and consequently the range will be further, all other considerations being equal. The difference in weight of the guns is no less remarkable: a smooth bore requires 1¼ to 4 cwt. of metal to every lb. of shot, the rifled gun ¼ to 1 cwt.

To what enterprising individual the honor of discovering the value of rifled fire arms is due, cannot now be determined; it has been said that the world owed the invention, as it does that of artillery, to Germany; and that at a very early period in the history of the weapons of modern warfare; it is probable it may have been one of those accidental contrivances which has more than once determined the value of an invention; and it may have arisen from the practice of building up a gun with straight bars of iron secured together by iron hoops, of which *Mons Meg*, in Edinbugh Castle, is an example; but there were certain practical inconveniences attending that mode of construction for which it became necessary to devise a remedy, as the outer hoops were liable to get slack and the inner bars to get forced apart. To obviate the difficulty the inner bars were *twisted* around the central core, and it was found that this disposition not only answered the purpose but gave increased accuracy of fire; it was only necessary to reproduce the *grooves* where the bars joined on the inner bore of the cast ordnance, a matter of no particular difficulty to human ingenuity, and the Rifle as it existed to within a late period was invented.

As the chief object attained by rifling a gun is accuracy of fire, and a longer range, the conditions necessary to secure those advantages are that the shot should fit the bore accurately, and that it should leave the gun by a spinning or rotatory motion around its own axis, to counteract the pressure of the air which tends to turn it over and render its flight unsteady.

An elongated bolt has greater power of penetration than a round shot, the latter exerting more of a smashing force in consequence of its larger diameter. Both are adapted to peculiar operations, and their relative value will be discussed in order.

As has been shewn, ordnance may be classed under the divisions of cast-iron or bronze, which are generally smooth-bores, and *built up* generally rifled; the former being the class in use up to 1860; since then they are being gradually superseded by the latter.

The various classes of guns which the inventive genius and mechanical skill of the period has produced, may be classed as follows:—

Muzzle or breech-loading rifled guns having projectiles of hard metal fitting the bore mechanically. Muzzle or breech-loading guns with projectiles having a soft metal envelope or sabot which is expended by the gas in the bore; Muzzle or breech-loading guns with projectiles having soft metal studs or ribs to fit the grooves. Breech-loading guns with projectiles having a soft metal coating larger in diameter than the bore.

The *Lancaster* and *Whitworth* guns are types of the first class—the first having an elliptical, and the latter an hexagonal bore. The projectiles of those guns are made of iron or steel without any external coating whatever, the shot being accurately turned to fit the bore. The *Lancaster* gun may be called a spiral ellipse, the *Whitworth* a spiral hexagonal. The first being a two grooved, and the latter a six grooved rifle with one revolution in 130 inches.

The great advantages possessed by those guns are: economy, simplicity and durability, while the chief objections are that both bore and projectile being hard metal fracture of one or other would be the result of jamming, a tendency towards that operation being shewn when experiments were made and the rapid wearing out of the bore by friction.

The guns rifled on the *Lancaster* principle were merely service cast-iron pieces, and the tendency to jam displayed by the shot arose from the fact of the spiral of the rifling having an increasing twist. As the shot was a plain elongated bolt made without any spiral twist, so that its centre or axis, and that of the gun, could neither be coincident nor parallel, it is not a matter of much surprise that it failed.

A gun known as Mr. BRITTON'S illustrates the second class—it has five shallow grooves and the shot of iron is enclosed in an envelope of lead with a wooden sabot attached.

The so-called *Woolwich* system is an example of the third class, and is applied to the heavy service ordnance, so conspicuously lately for the disastrous failures in practice. The grooves are three or more in number, according to the calibre of the piece, and they have rounded sides; the projectiles have gun metal studs, only two in each row, both being equal for the 7-inch gun, the grooves of which have an uniform twist; but for the 8-inch and higher calibres the top stud in each row is smaller than the bottom stud, so as to allow of the studs accommodating themselves to the varying angle of the grooves which in those guns have an increasing twist—the number of rows of studs is equal to the number of grooves. The system has been borrowed from the French, their guns have six spiral grooves and the projectile has corresponding rows of zinc studs; the sides of the grooves are angular; they are wider and shallower at the muzzle than at the breech, and thus oppose mechanical obstructions to the passage of the shot.

During the contest in the United States the armies on both sides used artillery belonging to this class; the Northern troops their Parrott guns, which threw a projectile with a brass ring at the base having projections radiating towards, but not to the centre, to prevent the shot turning round; they were *leaden coated*, and the nominal 9-pounder threw a 25 lb. shot. The Reed gun used by the Southern troops had an expanding ring on the base of iron, copper, or lead. Brookes' gun, largely used for siege ordnance, had a