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The Volunteer Review,
AND
MILITARY AND NAVAL GAZETTE.

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

OTTAWA, MONDAY, SEPTEMBER 16, 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.

IN the construction of Ordnance there was *very little improvement during the first half* of the present century: the seige of Sebastopol in 1854 developed some new ideas on the power and capacity of the guns then in use and set the scientific and mechanical enterprise of Europe in motion.

A short time previously 68-pounder guns weighing 95 cwt. had been introduced on shipboard, and one battery manned by seamen was engaged in the operations of that memorable feat of arms. During its progress the first rifled piece of artillery made its appearance. It was a gun with an elliptical bore and an increasing twist, so that in reality it was a *two-grooved* rifle. It was not eminently successful, having a tendency to blow off its own muzzle; it was called, after the inventor, the Lancaster system, and held the germs of the idea which led to the manufacture of all the rifled guns which have since been constructed.

During the same siege a monster mortar 36 inches in diameter was constructed by ROBERT MALLET, Esq., of the Victoria Iron Works, Dublin. Its weight was reported to be *thirteen* tons, but it was built up of a series of rings connected by a number of screw bolts, and the breech alone being solid offered the only problem to transport. Its weight did not materially exceed that of artillery of its class then in use—about 3½ tons. It is not certain whether the mortar was used, but a large number were constructed; and as the whole question connected with this branch of ordnance has been overlooked in the eager *battle of the guns*, it is not improbable that the system may possess superior merit.

The Italian campaign of 1859 was the first occasion on which rifled artillery appears to have been used in the field. The French army are said to have owed their success in more than one action to the power of their field guns; and immediately afterwards, Sir WILLIAM ARMSTRONG introduced his system of built-up breech-loading rifled ordnance into the British service, his heaviest gun being a 100 pounder.

As this system has been abandoned, in the British service at least, for an alleged radical defect, and muzzle-loaders adopted in preference, it will be as well to consider the guns now in use as our system of rifled ordnance.

Under the old regime, the gun was known by the weight of shot it threw; under the new, there appears to be a disposition to describe it by the diameter of the bore itself. They range from

7 inch	115 pounder	of 7 tons.	
8 "	180 "	12 "	
9 "	250 "	18 "	
10 "	400 "	25 "	
12 "	600 "	30 "	

to the Woolwich infant of 35 tons, throwing a solid shot of 700 lbs.

The smooth-bore ordnance being in all cases cast entire of iron or bronze, the rifled guns are built up of wrought iron either as rings shrunk on a central core manufactured from spiral coils or on a solid steel core.

With such powerful engines, demanding the utmost mechanical and scientific skill in construction and design, it would be supposed the results in action would be commensurate with the power and its advantages Practically this is not so: the guns have failed most essentially in endurance, and in such a manner as to suggest grave doubts of the value of the system and the correctness of the theory on which it is established.

In smooth bored muzzle-loading ordnance —windage—a space between the shot and bore—is a necessity of the system. Practically this resulted in a loss of power and velocity in the shot, from the fact that a good deal of the gas generated by the ignition of gun powder, and on which its force depends, escaped without exerting propelling power on the shot, while the latter moving at the first impulse a portion of the charge was thrown out without being ignited.

From the fact of the shot not fitting the bore tightly, its flight as a general rule was erratic—no certain direction could be given to it—and this constituted the chief fault of smooth-bored ordnance.

In order to remedy it, two conditions are apparently necessary: the shot should fill the bore of the piece, and its initial velocity should be retarded till the whole charge was ignited; but those conditions brought consequences which practically rendered their fulfillment impossible.

In order to fill the bore of the piece, the metal surface of the shot and of the gun should be in close contact; in fact, the former should slide over the latter with the facility of the valves of a steam engine sliding over the valve seat. For the first round this might have been eminently practicable; but after that the comparison ceases. The gun will foul rapidly; nay, even change form from heat, and in practice the shot could not be rammed home.

Sir WILLIAM ARMSTRONG tried to obviate this defect, by attaching a sabot of lead to his shot. The chamber being slightly larger than the bore, the softer metal was pressed into the grooves, and thus fulfilled in part the necessary conditions.

But a shot discharged *from a rifled barrel*, to have a true flight, must acquire a spinning motion around its own centre; and the value of the rifling is to impart that motion as well as to retard the bullet in the barrel till the charge is fully ignited: hence the value of the higher trajectory or flight of rifle bullets from small arms.

In the larger artillery, however, the rotatory motion had the effect of stripping the leaden coating from the shot; and as it accompanied the latter in its flight, it was generally scattered as langrage to the imminent danger of those engaged in operations under protection of its fire. It was this fault that caused the Armstrong system to be abandoned, after the British Government had expended over £1,000,000 in the manufacture of guns under it. Notwithstanding which, it may be questioned whether the defect could not have been remedied; and it is quite certain the system possessed far less radical defects than the muzzle-loaders which have been substituted therefor.

The theory of rifling great guns has been founded on the practical facts already noticed, and on the development of a mechanical law by which the greatest strain on a gun is at the breech, and therefore the twist of the rifling ought to increase towards the muzzle for the purpose of fulfilling the conditions of retardation. As the first effort of the ignition of gunpowder is imparted to the