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The Volunteer Review

AND

MILITARY AND NAVAL GAZETTE.

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

OTTAWA, TUESDAY, SEPT. 26, 1876.

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 at 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. No communication, however, will be inserted unless the writer's name is given, not necessarily for publication, but that we may know from whom it is sent.

WE have for the past *nine* years endeavored to furnish the Volunteer Force of Canada with a paper worthy of their support, but, we regret to say, have not met with that tangible encouragement which we confidently expected when we undertook the publication of a paper wholly devoted to their interests. We now appeal to their chivalry and ask each of our subscribers to procure another, or to a person sending us the names of four or five new subscribers and the money will be entitled to receive one copy for the year free. A little exertion on the part of our friends would materially assist us, besides extending the usefulness of the paper among the Force—keeping them thoroughly posted in all the changes and improvements in the art of war so essential for a military man to know. Our ambition is to improve the *Volunteer Review* in every respect, so as to make it second to none. Will our friends help us to do it? Premiums will be given to those getting up the largest lists. The *Review* being the only military paper published in Canada, it ought to be liberally supported by the officers, non-commissioned officers, and men of each Battalion.

WHATEVER may be the calibre of the military and Naval Ordnance of the future, the Mechanical Scientists of the present day have furnished the world with two specimens of Artillery unrivalled in size and power.

The Woolwich *infant* designed by officers of the Royal Artillery and known as "81 ton Gun," has been familiar to our readers since its first trial—we have now to record a later test.

"The experiments were resumed on Tuesday, the 25th June. When the bore was 15½ inches calibre, as much as 310 lbs. of the modern cube powder was fired, the limit being thus fixed because it was impracticable to consume and convert into gas a larger quantity within the bore. The increase in the barrel has necessarily augmented its capacity, and although it has to some extent thinned the walls, the gun is theoretically

regarded as capable of an endurance much greater than any to which it has yet been subjected, and Colonel Younghusband, in ordering it to be loaded with 320 lbs. of cube powder behind its 1700 lbs. shot, did not by any mean consider that he had reached finality. Indeed the stupendous charge, though it drove the mighty projectile into the sand butt at a measured velocity of 1469 feet per second, did not produce any inordinate strain upon the gun, the ingenious gauges by which the operators are enabled to feel its pulse while at work, recording throughout the trials a regular average pressure of merely twenty-one tons upon the inch. The energy exerted by this extraordinary round is calculated at 25,435 foot-tons, the concise way of saying that the force of the blow it would strike would be equal to the power required to lift all those tons a foot high. Only four rounds were fired, considerable time being occupied in examining the gauges and making calculations. At present only one description of powder, the one and a half inch cubes, has been fired with the gun in its present state, and that is the powder believed to be the most suitable for . . .

"Four more rounds were fired on Wednesday, the weight of the charges being 300 lbs., 330 lbs., 340 lbs., and 320 lbs. The weight of the projectiles fired was 1700 lbs., 1700 lbs., 1700 lbs., 1700 lbs. The muzzle velocity reached was 1487, 1479, 1494, and 1472. The mean pressure in foot-tons per square inch was 20.2, 20.6, 21.5, and 20.3. The total energy developed in foot-tons was 24,339, 25,782, 26,308, and 25,539.

"In two of the rounds fired on Wednesday, a new feature was introduced at the instance of the committee. This was the igniting of the charge at a point in the centre of its diameter, and about 16 in. from the rear of the charge, the cartridge being about 52 in. in length. An open wicker basket was inserted in the cartridge in making it up, leaving an opening at the rear end in line with the axial vent through which the charge was fired. The object of this system of exploding heavy charges, which is known as central ignition, is to stimulate the rapidity of ignition of the entire charge, with the view of preventing localisation of the pressures. Rapidity of ignition is not to be confounded with rapidity of combustion. While it is desirable that the gasification of all the atoms composing the charge should commence as simultaneously as possible, it is essential that the combustion of the charge should be graduated and retarded in reference to the greater or less quantity of powder present. If ignition is not simultaneous, then the powder gases first developed are projected violently upon the unignited cubes of powder, and great local pressure is created in the powder-chamber without a corresponding increase of general pressure.

"The 81-ton gun has now fired a total of 87 rounds, 21 of which were fired with the original calibre of 14½ in.; 32 rounds with a 15 in. calibre; 21 rounds with the same calibre and a 16 in. powder chamber, and 13 rounds with a 16 in. calibre—87 rounds. It is satisfactory to know that up to the 74th round, when the gun was sent in for reboiling, not a flaw or strain was discoverable. After the 87th round had been fired a critical external examination of the gun showed that the gun, the gearing, and the carriage were alike in perfect order, and there is no doubt that an internal examination of the weapon will disclose a similar condition of things.

"For the present the trials are suspended, but they will be resumed shortly, probably with still heavier charges than those here recorded. It would appear as if the com-

mittee were approaching a conclusion as regards the proper charge for the gun with its present calibre. The weight of the projectile has been settled, and so far the 1½ in. cube powder appears to be the best suited for the weapon."

The celebrated "100-ton gun" has been constructed at the Elswick Iron Works, Newcastle-on-Tyne, England, by the celebrated by Sir WILLIAM ARMSTRONG, who may be called the inventor of modern Rifled Artillery and munster guns.

In order to enable the Italian Royal Navy steamer *Europa* to come alongside the wharf at the Iron works a swing bridge moved by hydraulic power having two navigable spans of 100 feet each had to be constructed—its magnitude may be understood from the fact that the moveable part of the longest structure of the kind ever heretofore built was 800 tons, while the construction under consideration weighs 1500 tons.

To the following description of the 100-ton gun, which is copied from *Engineering*, we may add, that the weight of its carriage will be *thirty-five* tons—the cartridge will be 52 inches in length and 15½ inches in diameter, the powder will be cubes of one and one half inches a side—the projectile will weigh 2000 lbs. of chilled iron, it is *four* feet in length. *Engineering* says:—

"The 100-ton gun which left the Tyne a few weeks ago, for the Italian arsenal of Spezia, is the heaviest and most powerful piece of ordnance in the world, being 20 tons heavier than the huge guns with which it is proposed to arm the *Inflexible*. It is constructed on the well-known Armstrong principle, the inner barrel being of steel, rifled with twenty-seven grooves, the spaces between which are about equal to the width of the grooves themselves. The weight of the gun is 101½ tons; its extreme length is 32 ft. 10 in.; the length of the bore is 30 ft. 6 in.; and the diameter is 17 in. The outside diameter of the gun at the muzzle is 29 in., that at the breech being 77 in. The barrel is in two pieces, made into one in the building up. There are three layers of coils over the thickest end of the gun, and the steel tube is in two pieces, joined by a double ring, so as to make one tube. The rifling is an increasing spiral, on what is called the parabolic development, winding up with a twist of 1 in 45 calibres. The depth of the grooves is ¼ in. throughout. Rotation is given to the projectile, which quits the gun at a velocity of about 1,400 ft. per second, not by the usual studs fixed in the projectiles to fit the grooves, but by a copper gas check fixed into the breech end of the shell, which has projections upon it corresponding with the rifling grooves of the gun. Where the check bears against the shell, the shell is so formed that the check on being crushed against it by the pressure of the explosion and the charge presses firmly about it, and the gas check being caused to rotate by the rifling grooves causes the projectile to turn to take the same rotation. The loading gear is hydraulic.

"The weight of the armor-piercing projectile is 2,000 lb., and that of the proof shot 2,500 lb., being 1,240 lb. more than that of the 81-ton gun. It is calculated by Captain Noble that the work developed by the shot when it quits the muzzle will be about 39,000 foot-tons, as compared with a power of 24,000 foot-tons realised in the 81-ton gun, or 30 per cent. greater. The aggressive force of the shot is estimated as equivalent to piercing