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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, TUESDAY, MARCH 3, 1874.

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

THE leading article of the United States *Army and Navy Journal* of the 10th ult., is devoted to a synopsis of the Report of the Board of officers appointed by the War Department, "to select a proper calibre for small arms," and, as it is full of interest to our readers, we reproduce it below. In our own military force we have many scientific experts in all the questions connected with small arms, and very many amateur riflemen, the results of the enquiry will furnish matter for discussion which we would like to see undertaken in a proper manner.

The heated contest raging between the proprietors of the different breech loaders should not blind us to the fact that the main question to be considered in regard to small arms is quite as much to ascertain what is the best description of ammunition as it is to obtain the best gun. So much inventive genius has been devoted to the improvement of breech loaders, that those best qualified to judge hesitate to decide between the merits of the three or four best kinds. They all come fully up to the standard required, which is that they should be safe, simple in construction, and not liable to get out of order, and all admit of fully as great rapidity of fire as is consistent with a due regard for aim, and greater than would be required in actual service. In devising that form of bullet and system of rifling which will give the best results and which is applicable to all rifles, a large field is offered to the experimenter, and any extended series of experiments must lead to valuable additions to the existing knowledge upon the subject.

The report of the board, appointed by the War Department "to select a proper calibre for small arms," contained in the "Ordnance Memoranda, Number Fifteen," recently published, and which we have heretofore allnded to, will therefore be found of great value to sportsmen as well as military men, the more so as the exhaustive series of experiments undertaken by them have, it is believed, in addition to settling a number of disputed questions, resulted in producing a form of bullet and system of rifling surpassing in its results any other hitherto known.

In the selection of the calibre .45 the board have arrived at substantially the same conclusion as nearly all the best private rifle manufacturers; the Metford, Rigby, and Henry-Martini being of that calibre, while the best Sharpe and Remington rifles are .44 calibre, a very slight variation. The "gaining twist," once so popular, seems not to work as well in practice as has been supposed. It has, therefore, been given up and a uniform twist of one turn in twenty-two inches recommended, with three shallow concentric grooves .005 inches deep, the lands being of equal width. In the selection of a bullet nearly every form that could be suggested was thoroughly tested, the one settled upon finally being hardened by an alloy of one-twelfth tin, and compressed or, in other words, "swedged." In form it is a cylinder (.55 inches long and .458 inches in diameter); it then becomes slightly tapering for a further distance of .35 inches (being .42 inches at its termination), and ends in a round point, nearly a hemisphere, the entire length of the bullet being 1.11 inches. In other words, the board recommend a long cylindrical bullet with an almost perfectly round point, very much like the Metford, except it is a little shorter.

On the question of lubrication the board discard the idea of base lubrication or greased paper patches, and recommend five *cannelures* (.075 inches wide) around the base of the bullet, being .03 inches deep and .05 inches apart, with a slight cavity in the base. This question of *cannelures* is one upon which definite information has long been desired. All the most approved bullets have been made for some time prefectly round with base lubrication, with the exception of the new Remington long range rifle, which has no lubrication whatever. All of them use as a paper patch.

If, however, accurate results can be produced by *cannelures*, and dispensing with the patch, it will be welcome news to many riflemen who have been annoyed by the wrinkling of the paper patch and the fouling of the smooth bullet. These experiments certainly show that the board are right, as by the use of the bullet in question, the gun was left "very clean" after 103 rounds. This is a matter which our riflemen at Creedmoor will do well to take into consideration, for no end of time and bother is caused by their having to wipe out their rifles after every shot.

The charge of powder recommended is seventy grains of musket powder and 405 grains of lead, the accuracy being diminished as the charge was increased. The board also found that no superiority of accuracy was obtained by shortening the hold of the cartridge upon the ball, while the usefulness of the ammunition was decidedly impaired, thus destroying another venerable theory in regard to metallic cartridges. They also found a general superiority of straight over bottle-shaped cases and chambers.

The result obtained by the system selected are certainly extraordinary, both in regard to accuracy, flatness of trajectory, and cleanliness. The English Henry Martini has always been considered as being the most accurate military rifle known, although, in fact, it is more truly a first class target rifle than a military weapon. In addition, it carries a heavy charge, using fifteen grains more powder and eighty grains more lead than the rifle selected by the board. Yet the result of these tests shows that the bullet adopted—although used in what is by no means admitted to be the best of our American breech-loaders—produces results superior to any obtained in England from a military rifle. In a target of 100 shots fired *without cleaning* at 500 yards, its mean deviation was but 8.55 inches, the Henry-Martini being 9 9 inches, and the Russian Berdan 14.9 inches, the former being the best target ever made at the Springfield Armory. In one of these targets of twenty shots the mean deviation was but 6.27 inches, being the best on record. At 800 yards its mean deviation was 20.4 inches, with but one miss to two targets, while the Henry-Martini was 20.1 inches, with *two* misses to each target, and the Russian Berdan 26.7 inches, with *seven* missis. At 1,050 yards its mean deviation was 35 2 inches, the Henry-Martini being 33.7 inches, with five misses to a target, and the Russian Berdan 73.2 inches, with three misses.

As to range and flatness of trajectory, while in firing at a common elevation, the Henry-Martini struck at 421 yards, the .40 calibre going to 500 yards, but not being accurate. And at longer range, while the service bullet struck at 831 yards, and the Henry-Martini 933 yards, this struck at 957 yards. In all cases its flatness of trajectory was much greater than that of the Henry-Martini, which in its turn was much lower than the service calibre, as shown by the following table:

Range, yards.	Corrected angles of sight.			Height of 1,000 trajectory in feet at each range.		
	.45 Cal.	Henry Martini	.50 Cal.	.45 C'l	Henry-Martini.	.50 C'l
	0·1.11					
100.....	11·36	24 .30	18.0	16.9	16.9	21.2
200.....	23·56	27 .1	30.0	32.2	33.3	40.6
300.....	41·29	50 .10	48.20	43.7	43.9	56.8
400.....	52·8	1. 7.7	.....	54.5	54.6	....
500.....	1·5·2	1.24.6	1.19.56	62.5	58.4	71.3
600.....	1·31·41	1.44.21	.....	61.0	59.4	....
700.....	1·49.20	2. 0.51	2.19.48	60.5	59.2	87.0
800	2·23·8	2.31.16	.....	45.4	46.5	....
900.....	2·44·22	2.59.19	3. 0.0	34.4	37.3	63.0
1050.....	3.23·6	3.37.48	.....	0:0	0.0	0.0

This table may be of value at Creedmoor, although some riflemen there may be surprised to know that the path of a bullet fired at 1,000 yards is over 60 feet high.

The true test of trajectory is, however, the dangerous space at the different ranges, and in this the new bullet is superior, being as follows:

At 500 yards.....200 feet
At 800 yards..... 90 feet
At 1,050 yards..... 75 feet