

Cooke has without doubt given us the best text book extant on Naval Gunnery, and we think that he and the officers of the Academy who have so ably assisted him deserve to be congratulated on the success of a very laborious undertaking—one that required an intimate knowledge of a very large variety of subjects, and an immense amount of research, to bring his information down to the present time.

The *New York Times* says:

The officers of the United States Board of Ordnance has resumed their experiments on converted smooth-bore guns on the proving grounds at Sandy Hook, and were engaged yesterday and the latter portion of the day before in the trial of a 10-inch smooth bore converted into an 8-inch rifle by the insertion of a rifled steel tube. The 10 inch gun, converted on the same principle and to the same calibre, which underwent a test last fall of over 500 rounds is also being occasionally fired, the purpose of the board being to determine the relative merits of steel and wrought iron tubes. The results attained in the trial of the first converted gun having conclusively proved that the old Rodman guns cannot only be utilized by means of this plan of rifling, but rendered equal in point of strength and accuracy to the guns of Prussia and England, the only question which remains to be settled is the comparative strength and durability of the steel and wrought iron tubes. In order that this may be definitely ascertained, both will be subjected to an extreme test by the firing of inordinately large charges after the gun containing the steel tube has undergone the preliminary test of 500 rounds. It is looked upon as quite certain that, in the event of either of the guns bursting, more damage will result from the one with the steel rifling. When the pressure is too great the wrought iron, instead of bursting, strictly speaking, merely swells, throwing aside the outer coating of cast iron in a few large masses, while the steel bursts with such velocity as to break the gun into small pieces and scatter the fragments in all directions. The gun now being experimented upon has so far worked very satisfactorily, the results being almost similar to those attained in the trial of the first. The following is the record of the twenty four rounds fired up to noon yesterday, with projectiles of an average weight of 184 pounds:

Charge	No. of Rounds.	Velocity—Feet per second.	Pressure in Pounds per Square in.
20	1	1,142	21,000
20	2	1,157	18,000
25	3	1,224	25,000
25	4	1,260	20,000
30	5	1,353	26,500
30	6	1,368	25,500
35	7	1,441	27,000
35	8	1,428	26,500
35	9	1,429	33,500
35	10	1,406	25,000
35	11	1,421	26,500
35	12	1,439	28,000
35	13	1,433	30,500
35	14	1,441	28,000
35	15	1,439	33,000
35	16	1,465	31,500
35	17	1,467	28,000
35	18	1,410	31,000
35	19	1,434	40,000
35	20	1,428	28,000
35	21	1,444	29,500
35	22	1,379	31,500
35	23	1,385	28,000
35	24	1,381	31,000

The projectiles and powder used are of the same description as those used in the experiments last fall, and are of the latest and most improved kinds. The powder is known as the mammoth powder, the grains being about the size of a chestnut, hexagonal in shape, and so regular in size as to insure uniformity of inflammation and combustion. The carriage on which the gun is mounted is of the old pattern, but is supplied with a hydraulic recoil check, which perceptibly reduces the recoil. It is an entirely new contrivance, having been used but once before.

The 9 inch Sutecliff breech-loading rifle, a description of which appeared in a late edition of the *Times*, has been mounted near the other guns, and will be tested in about a month or six weeks.

Report of Lieut.-Colonel Brunel on an Improved Target Constructed by him and used at the Dominion Rifle Association Matches, 1874.

OTTAWA, Oct. 14, 1874.

DEAR COLONEL POWELL,—

Enclosed you will find a memo. in reference to the cost and efficiency of the new targets.

If I remember right you spoke of having the drawings engraved and printed with your report. I have made new ones as I wish to show the improvements which have resulted for over five days experience. I suppose your object is to afford such information as will enable parties to construct targets on this plan for themselves; if so the short specification which accompanies the drawings will be sufficient.

I am, by the experience now gained, led to the conclusion that a pair of targets on the new plan—assuming that not less than ten sets are ordered at one time—can be constructed and equipped on the following estimate:—

Iron and wood work complete	\$80 00
Canvas or wood disc of Target to last 20 days	6 00
Signal discs for twenty days shooting	6 00
Paper covers of Targets for 20 days	50
Open trench and shelter from weather to take the place of the covered pits or mantlets heretofore used. According to situation usually about 70 yards of earth will have to be moved, and about 100 feet of lumber used	25 00
	\$117 50

Of this the permanent work costs... 105 00

The remainder lasts 20 days, and is therefore equivalent to 62½ cents per diem, while target practice is actually going on. This daily expenditure takes the place of the cost of the paint, brushes, signal discs, &c., now commonly used.

I think I am justified in speaking with confidence as to the success of the experiment. So far as I could learn, the competitors at the late Dominion competition were entirely satisfied with the result. All the objects aimed at have been fully attained, and in a greater degree than was hoped for. These objects may be stated as follows:—

1. The markers are perfectly safe in the open trenches, there are no "splashes" of lead whatever.
2. As a consequence the construction of the trench only cost about one-third of the cost of the pit.

3. The whole of the markers of a line of targets may be placed under the direct supervision of an officer or non commissioned officers.

4. The marking will therefore be much better done.

5. The work of marking is much easier to the men, as they are relieved from the constant strain of watchfulness. The passage of the bullet through the canvas is distinctly heard in the open trench as the "hit" on the iron target is heard in the covered pit or mantlet. When the hit is heard the marker pulls down the target and has it at once in a convenient position for inspection.

6. The signalling is much more satisfactory than the old system. The exact position of the hit is distinctly shown on the target itself, and the signal remains there until another hit has been made.

7. Firing can be carried on in weather which renders it impossible at the old targets. A very heavy driving rain would of course wash off the paper, but during ordinary showers that wash the paint off the iron, and in light drizzling mists that obscure the plate glass and make it difficult or impossible to see the shot marks on it, the work goes on without interruption on the new targets. This was satisfactorily established at the Dominion competition, when, on one of the days, the marking on the iron targets was stopped by the rain, there was no interruption on the canvas.

8. With the most ordinary attention and intelligence there can be no erroneous signalling, as there can be only one shot hole uncovered at the same time. During the five days shooting at this target no signal was questioned nor did I hear of a doubt being expressed as to the counting.

9. The markers are much more comfortable while in the performance of their work than in the old covered pits or mantlets; they are, therefore, both able and willing to do their work effectually. There is a free circulation of air and they are sheltered from the weather, whether it be the heat of the sun or rain.

10. The whole of the working and expensive parts of the target are protected from the missiles, and are therefore safe from damage from that resource to which the old targets are so fully exposed.

11. The marking on the whole is much quicker. The time required for changing the targets from one class to another does not require more than one minute and can be done by one man if necessary, though, of course, more easily by two.

As was to be expected some alterations—all in the direction of reducing the cost—were found desirable, and drawings are herewith, shewing the targets with these improvements.

Signalling.

The following method of signalling the hits was used at Ottawa:

A supply of discs, made in sets, of common pasteboard, and of the proper colors, were given to markers; those for the small target were about six inches in diameter, those for the large targets about ten inches. To the centre, and on the back of each disc, there was fastened a common wire hook—large wire curtain hooks were used—by means of which the proper disc was hooked into the shot hole to be signalled, where it remained until another hit was made; the proper signal was then placed on the new hit, and a patch pasted over the old one.

In this way the color of the disc signalled the exact value of the hit, and its position