PROFESSIONAL PAPERS OF THE CORPS OF ENGINEERS. NO. 14: SIEGE ARTILLERY IN THE CAMPAIGNS AGAINST RICHMOND WITH NOTES ON THE 15-INCH GUN, INCLUDING AN ALGEBRAIC ANALYSIS OF THE TRAJECTORY OF A SHOT IN ITS RICOCHETS UPON SMOOTH WATER

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AN ALGEBRAIC ANALYSIS OF THE TRAJECTORY OF A SHOT IN ITS RICOCHETS UPON SMOOTH WATER.

ILLUSTRATED BY ACCURATE DRAWINGS OF A LARGE COLLECTION OF THE RIFLE PROJECTILES AND FUZES USED BY EACH ARMY IN VIRGINIA

BY BVT. BRIG. GEN. HENRY L. ABBOT, U. S. ARMY,
MAJOR, CORPS OF ENGINEERS,
Late Bvt. Maj. Gen. Vols., com'dg Siege Artillery before Richmond.

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TABLE OF CONTENTS.

LIST OF PLATES.

WOOD CUTS.

INTRODUCTION.

Scope of the Memoir. Record of the 1st Connecticut Artillery. Organization of the siege artillery brigade before Richmond. Artillery data collected.

The campaigns against Richmond were chiefly those of a large army manœuvring in the field, where siege artillery was of secondary importance. Still two large trains were brought into use, one in 1862 and one in 1864–'65, and two batteries of siege guns accompanied the army of the Potomac in its campaigns of 1863.

The rapid progress made of late in the science of artillery demands close attention from the Corps of Engineers. Indeed any facts bearing upon the capabilities, uses, and theory of modern ordnance possess an interest almost as great for engineer as for artillery officers. For these reasons I have devoted such time during the past year as my professional duties would allow, to preparing the following memoir, designed to place in a small space the most important results of the recent experience in Virginia. Incidentally, an analysis of the problem of ricochet firing upon water has been attempted, based upon certain data collected before my volunteer command was disbanded at the end of the war.

Having no personal experience with the train of 1862, except as an officer of engineers, I shall make no attempt to elaborate the reports of Colonel Tyler, commanding, and of his ordnance officer, Major Doull, both of which are added to this paper as appendix A. Reference should also be made to the detailed report of General Barry, chief of artillery, army of the Potomac, already published.*

For details concerning the two heavy batteries moving with the army, reference should be made to appendix B, containing a report of Captain Pratt, who commanded one of them.

*Report of the Engineer and Artillery Operations of the Army of the Potomac, from its organization to the close of the Peninsular Campaign.—*Barnard* and *Barry*, 1863.

To the train of 1864–'65, which was under my personal command, the following pages are chiefly applicable. Many valuable details concerning it will be found in the report of Major Hatfield, contained in appendix C.

The important batteries of siege guns in all these campaigns were served by the 1st regiment of Connecticut artillery, which was thus identified in a conspicuous manner with the history of the army of the Potomac. This paper is therefore in some sort a record of its labors, and especially of its contributions to the science of artillery.

RECORD OF FIRST CONNECTICUT ARTILLERY.

In May, 1861, this regiment was mustered into the United States service as infantry. On January 1st, 1862, it was changed to artillery. After a few months of drilling in the defences of Washington, it went into the field under Colonel Tyler to serve the siege train of 1862. It there took rank as one of the best disciplined and most efficient regiments in the army, and became imbued with a spirit of enthusiasm for the duties of its special arm.

In January, 1863, after the promotion of Colonel Tyler, his Excellency W. A. Buckingham, Governor of Connecticut, conferred upon me (then captain of engineers, United States army) the appointment of colonel of the regiment. From that date until its muster out of service in September, 1865, it remained under my command; constituting the basis of an artillery brigade which sometimes exceeded an aggregate of 3,500 men.

During 1863 the regiment was stationed in the defences of Washington, except companies B and M, which served the two heavy batteries already mentioned. They each consisted of four $4\frac{1}{2}$-inch ordnance guns, and were attached to the artillery reserve of the army of the Potomac, where they were under the immediate command of Brigadier General Hunt, chief of artillery.

The ten companies in the defences of Washington under Brigadier General Dé Russy, as division commander, and

Brigadier General Barry as chief of artillery of the department, had every facility for a thorough training in both the theory and practice of siege artillery.

At the opening of the campaign in 1864, the united regiment was ordered to more active service; and from that date to the capitulation of Lee the siege artillery brigade served all the heavy guns in front of Richmond, firing about 65,000 rounds, or over 1,200 tons of ammunition.

Subsequently it removed all the captured ordnance of a calibre sufficiently large to require any special professional skill in its handling.

A detachment with a siege train accompanied General Terry at the taking of Fort Fisher, North Carolina, and there had some rare experience in unloading heavy guns on an exposed ocean beach.

At an epoch when progress in the science of artillery is as rapid as at present, operations so extended should be turned to account in developing the theory of the arm. Inspired with this idea, and eager for the scientific reputation as well as for the efficiency of the regiment, its officers undertook and succeeded in collecting a series of records heretofore unattempted in actual warfare.

The present pages place these records in a convenient form for future reference, together with such practical deductions as are suggested by an experience of more than two and a half years in a responsible artillery command.

ORGANIZATION.

In order to decide what confidence shall be accorded to any series of observations, it is essential that the system under which they have been conducted shall be known. This is especially true in a case like the present, where a machine so extensive and complicated as a siege train is handled by volunteer troops. For this reason, as well as because the efficiency of artillery depends very much upon its organization, I deem it proper to give in some detail the