

**THE FORTIFICATIONS OF TO-DAY:
FIRE AGAINST MODELS OF COAST
BATTERIES AND PARADOS.
HORIZONTAL AND CURVED FIRE
IN DEFENSE OF COASTS**

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The Fortifications of To-day: Fire Against Models of Coast Batteries and Parados. Horizontal and Curved Fire in Defense of Coasts by Various

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VARIOUS

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THE FORTIFICATIONS OF TO-DAY.

FIRE AGAINST MODELS

OF

COAST BATTERIES AND PARADOS.

HORIZONTAL AND CURVED FIRE

IN

DEFENSE OF COASTS.

TRANSLATED UNDER THE DIRECTION OF
THE BOARD OF ENGINEERS FOR FORTIFICATIONS.

Colonel JOHN NEWTON, Corps of Engineers,
BREVET MAJOR-GENERAL, U. S. A.,
President of the Board.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1883.

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LETTERS OF TRANSMITTAL.

OFFICE OF THE CHIEF OF ENGINEERS, UNITED STATES ARMY,
Washington, D. C., May 23, 1883.

SIR: The Board of Engineers for Fortifications and River and Harbor Improvements has submitted to this office translations of several articles from foreign books and magazines which it is thought will be useful to officers of the Corps of Engineers in connection with important questions of defense now occupying the attention of military men.

I beg leave to suggest that these translations, with the accompanying plate, may be printed at the Government Printing Office for the use of the Engineer Department, and that 1,000 copies be furnished on the usual requisition.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

HON. ROBERT T. LINCOLN,
Secretary of War.

[First indorsement.]

Approved.

By order of the Secretary of War.

JOHN TWEEDALE,
Chief Clerk.

WAR DEPARTMENT, *May 26, 1883.*

OFFICE OF BOARD OF ENGINEERS FOR FORTIFICATIONS AND FOR
RIVER AND HARBOR IMPROVEMENTS, &c., ARMY BUILDING,
New York, May 21, 1883.

GENERAL: The Board submit herewith articles translated from foreign books and magazines, and recommend the publication of them for the use of engineer officers.

1. Translations from "Festungen und Taktik des Festungskrieges in der Gegenwart," by A. von Bonin, General-Major, Berlin, 1878. Chapters I and II.
2. Translations from "Giornale di Artiglieria e Genio," Ottobre, 1881. "Fire against models of coast batteries and parados." Extract.

3. Translation from the same, Agosto, Settembre, 1881. "Horizontal and curved fire in the fixed defense for coasts." Extract.

It is thought these publications will be useful in directing the attention of officers to some of the important questions of defense which now occupy the attention of military men.

On behalf of the Board.

Very respectfully, your obedient servant,

JOHN NEWTON,

Colonel of Engineers, Bvt. Maj. Gen'l U. S. A., President of the Board.

Brig. Gen. H. G. WRIGHT,

Chief of Engineers, U. S. A., Washington, D. C.

THE FORTIFICATIONS OF TO-DAY.

[Translation from "Festungen und Taktik des Festungskrieges in der Gegenwart," by A. von Bontin, General-Major, Berlin, 1874.]

CHAPTER I.

THE INFLUENCES WHICH BEAR UPON THE PRINCIPLES OF THE ART OF FORTIFICATION AND SIEGE OPERATIONS OF TO-DAY.

Although guns and small arms must always be considered of first importance in war, their influence differs in field and siege operations

While in the field even their moral effect is no small consideration, yet this is thrown in the background when compared with their material effect in siege operations, where increased cover shields both combatants

While in field operations guns and small arms contribute only proportionately with other factors towards success, in sieges they assume a prominent and more or less decisive effect.

While in field operations the effect of small arms is of equal value with that of artillery, the latter must be considered the more important and frequently as the decisive element in siege operations.*

The extraordinary progress made during the last decades in the manufacture of arms of all kinds has exercised a great influence upon siege operations, and as a consequence upon the tactical principles of the art of fortification. The perfecting of small arms has been carried so far that against their increased range and accuracy of fire a better cover became necessary. Yet this applied equally to both combatants, without requiring a change in the system of their works.

But the latest improvements in ordnance, by the introduction of rifled guns, demanded a change in the system, inasmuch as (not considering the greater importance of artillery in siege operations) the improvement in range, accuracy of fire, and destructiveness was proportionately much greater than in small arms, especially since by the development of indirect fire, a new field of activity was opened to the artillery.

The limits of effective fire of the former smooth-bore siege guns was 600 paces for dismounting guns and demolishing embrasures, 800 paces for ricochet fire against rampart lines, and a distance of 1,500 paces generally as the greatest range for effective artillery fire; but the great accuracy of modern rifled guns admits of a range of

* Yet the relative value of artillery must not be overestimated. Of the forty-five officers of all arms killed and wounded before Strauburg in 1870-71, twenty-two were hit by bullets; only in the artillery was the loss principally due to hostile artillery fire, but 15 per cent. of this loss being caused by musketry.

2,000 paces for counter-batteries, 3,500 paces for ricochet fire against rampart lines, while the extreme effective range of heavy guns exceeds a German mile.

The power of destruction of the new projectile is also greatly superior to that of the old spherical shot and shell; it is composed of power of penetration (square of terminal velocity multiplied by weight of projectile) and effect of bursting charge.

It may here be mentioned, for instance, relative to the power of penetration, that the projectile of the heaviest new siege gun, the 15 c. m. ring cannon, is theoretically fifty times as great as that of the old long 24-pounder.

The greater bursting effect of the new projectile, having the same bursting charge as the older spherical shells, is merely the result of the greater penetration of the former.

From the consideration of these conditions, in connection with the extraordinary increased accuracy of fire, the greater destructiveness of modern guns may be inferred, and this is heightened still more by the tougher and harder material (cast steel and chilled cast iron) now generally employed in the manufacture of modern projectiles, especially when used in a siege against inanimate and more durable objects (masonry work). Of still greater importance was the development of indirect fire of artillery, which started with the introduction of rifled guns.

Although formerly indirect artillery fire was known and employed (aside from mortar fire) in field operations with howitzers against objects hidden from view by the ground, and in sieges from ricochet and enfilade batteries, yet its effect consisted more in rendering the ground or work so fired at insecure than in obtaining certain results against a fixed object; such result could in most cases be considered merely accidental, or could only be attained by a disproportionate expenditure of ammunition.

The introduction of rifled cannon, with the extraordinary regularity of trajectory of their projectiles, led to the result that objects which were hidden from view could be reached with great certainty by indirect fire, and greatly increased the need for cover against the fire of artillery. The short 15 c. m. cannon, which is the most suitable piece of modern ordnance for indirect fire, admits, on account of its great accuracy and destructive power, a breaching of masonry when the projectile strikes with an angle of fall of 10° , and an effective side fire against gun emplacements, shelters, &c., with an angle of fall up to 20° .

Although the accuracy of its fire is reduced with greater angles of fall, it will still suffice to search by ricochet fire the terrepleins of fronts of a besieged position to the same degree as the older howitzers. Finally, it must be mentioned that the effect of vertical fire has been much increased by the introduction of heavy rifled mortars.

The long shell of the 21 c. m. mortar, weighing 160 pounds, with a bursting charge of 10 pounds, when fired at extreme range of nearly 7,000 paces, will descend from a great height, and has shown such accuracy of fire and power of destruction in the experimental firing that it seems to be destined to play a prominent part in future sieges. Yet its influence upon the art of fortification will make itself felt more in a technical than tactical point of view.

If we consider more closely the influence which the improved artillery must exercise upon attack and defense of fortified positions, we find that the long range,

combined with increased accuracy of fire, will favor the besieger so far as it will give him great freedom in selecting positions for his artillery, thereby rendering him more independent of the location of the fortified position he wishes to attack. He is not confined for his battery emplacements to a narrow area which the besieged has already prepared for that emergency, but can utilize to the fullest degree the advantages which a great extent of ground around the besieged position will generally offer him, by the existence of commanding points or by the natural cover afforded by the ground, for lines of communication and works, which require no commanding position, but must rather be hidden from the view of the besieged.

The greater distance from the fortified position at which siege batteries may now be established will give the besieger a further advantage, as it will often enable him to direct the fire of batteries intended to attack a certain portion of the fortified position also against collateral works, bearing directly upon the progress of the siege and against the interior lines of defense, without having to resort to the erection of separate batteries against each of them.

The longer range enables the defense to combat successfully the more distant siege batteries and to threaten the depots of the besieger, unless they are located at such distances from the fortified position as to render the service of the siege operations, and especially the supply of siege batteries, much more difficult.

A great extent of front development of the defense, and a formation of the ground which favors the erection of counter approaches, may greatly heighten the effects of collateral works and advanced counter-batteries against the attack. But of special importance to the defense is the great accuracy of fire of the modern guns, which will benefit the besieged in a marked degree, owing to the smallness of the target which siege works offer.

The advantages of greater destructive power of modern projectiles incline decidedly more to the side of the attack. Its works, such as batteries and trenches, built entirely of earth, and of little height, offer but small objects for destruction by projectiles, and admit a ready repair of the damages caused by the guns of the besieged, while on the other hand the raised permanent works of the defense, with their numerous masonry and bomb-proof constructions, furnish objects against which the effects of modern projectiles will be more destructive. But the service magazines and shell-rooms of the besieger, which are to be connected with the batteries, demand greater security, in view of the greater destructive power of modern projectiles.

The effects of this power, in regard to the destruction of embrasures and guns, are nearly alike to besieger and besieged.

The same applies to the needed cover against indirect fire, while in regard to the effect against covered objects the advantage again inclines towards the besieger. The narrow siege batteries and trenches are only threatened by the indirect fire of the besieged in locations where the besieger has taken advantage of the natural cover furnished by the ground, while the works of a fortified position, in their more complicated construction and with their greater depth and successive lines of defense, offer to the indirect fire of the besieger a much better field for destruction.

This is especially the case when the indirect fire is not confined to a single fixed