

# Fort Stevens Review

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*Helping to Preserve The History Of Oregon's Fort Stevens State Park*

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## The Mighty Mortar and Its Development at Fort Stevens

By D. Lindstrom

### Background

As the nation exited from the Civil War in 1865, it began to dawn on America's military planners that war engine developments during that conflict were needed to protect homeland shores from potential enemies fully capable of using them for their own purposes. These developments rapidly improved and twenty years later, in 1885, a group of experts were called together by President Grover Cleveland to determine the best course of action to take. The Board of Fortifications, chaired by Secretary of War William Endicott, became known as the Endicott Board. Within a year the Endicott board issued its report. The report called for a series of fortifications to ring the nation along the Atlantic, Gulf, and Pacific coasts. The weaponry included submarine mine fields in harbors protected by shore emplacements of newly developed rapid fire guns. Emplacements of larger caliber guns, also newly developed, were to be placed nearby to discourage the enemy from entering the harbors in the first place.

The larger caliber guns included 10-inch and 12-inch rifles fastened to disappearing carriages. These carriages limited the guns' traverse to approximately 130 degrees. Consequently, Army engineers situated multiple emplacements around a harbor so their traverses would intersect and hopefully cover all points of the compass: Thereby preventing a clever enemy from finding a dead area and sneaking in. These so called dead areas must have worried the Endicott planners, because they came up with another weapon calculated to not only fill in dead areas but to scare the living daylights out of the enemy. The weapon? The mighty mortar.

During the Civil War mortars were used mostly to protect coastal areas from enemy ships. The most famous mortar of that era was called "The Dictator," which had a 13-inch bore. While anchored to a rail car, it was used in the Siege of Petersburg. This type of weapon made an impression on the Endicott board, as in the original report they recommended more of these than rifles. By

now the mortar and its carriage were developed into a formidable weapon with a 12-inch bore and featuring a 360-degree traverse, or field of fire. Thus potential dead areas and rear approaches were covered. These weapons accommodated deck piercing, or armor piercing, shells weighing from 700 to over 1,000 pounds. The smaller shell had a range comparable to the 10-inch rifle. When fired, the shell traveled in a high arch with the intent of screaming straight down, piercing the deck of the enemy ship, and exploding inside. As a high arch was necessary for the shell to descend on the deck as envisioned, the mortar was not always useful for close in firing.

While the plunging effect was a plus for the mortar, it was less accurate than rifles which had a lower and more predictable trajectory. So mortar crews had to work smarter, harder, and faster to keep up the rate of fire needed to insure a "hit."

As the Endicott Board did its work, Henry Abbot, an acclaimed Army Engineer, advocated that in a given harbor mortars should be placed in four clusters, with four mortars each. As fire control development was behind that of weapon development, he advanced the idea of firing all sixteen mortars at once in shot-gun style. The concussion would have been dangerous and likely injurious to the gun crew while terrifying the sailors on the receiving end of 1,000 pound shells raining down on them.

The notion of clustering sixteen mortars in four quads was quickly dropped. However, the plan to cluster four mortars in a so-called Abbot-Quads stuck. These quads were usually forty by seventy-five feet with four monstrous mortars placed up and close to each other. Usually a high sand berm surrounded three sides of the quad with the rear clear for crew access. The trend was to emplace two Abbot-Quads, for a total of eight mortars, in a battery. In the early days, mortar batteries featured electric cables running to all the quads from the "firing room," thus allowing simultaneous firing.

The concept of firing all the quads in shot gun style remained

until approximately 1911 when fire control became more dependable. Then, mortars tended to be fired one at a time in quick succession. Actually, aside from local folklore, there is little evidence that entire quads were fired simultaneously.

As was true of all coastal defense weapons, the operation of the 12-inch mortar was labor intensive. One source maintains that each quad, or mortar pit, had a contingency of 88 men under a "pit commander." Each mortar was operated by a "detachment of fourteen men." Then, "a compliment of thirty-one men," handled the ammunition (some of these individuals worked in the shell room and magazine). The gun detachments were squeezed into a small area not only filled with four monstrous mortars but also surrounded on three sides with a high berm which consolidated the concussion and sound. Needless to say, as noted above, changes were eventually made. By firing mortars signally, it stands to reason the one or two gun detachments could be eliminated.

### Fort Stevens: Battery Clark, A 12-Inch Mortar Battery

As the weapons of the Endicott era were being developed and constructed, there was less certainty about the best emplacement design and operation of the 12-inch mortar than for the disappearing rifles. The construction and early operation of Battery Clark at Fort Stevens, Oregon illustrates this dilemma beautifully. For the Columbia River harbor, of which Fort Stevens was a part, the Endicott Board decided upon the extreme end of the Abbot Quad system. Three mortar batteries of four quads each, or pits, were recommended, for a total of forty-eight 12-inch mortars! Two of the three were assigned to the Washington State side of the Columbia River, and one was designated for Point Adams, the location of Fort Stevens. As with a number of the Board's recommendations, this never happened.

By mid 1897 Captain Walter Fisk, Army Corps of Engineers, Portland, Oregon, had submitted a design for the Fort Stevens mortar battery to the Division Engineer at San Francisco and to the Chief of Engineers in Washington D.C. (At this time, mortar batteries were not located on the other side of the Columbia River.) His design somewhat conformed to the thinking of the day, but he found that not everyone agreed. He recommended two pits, or quads, of four mortars each with a relatively low berm, or parapet, on three sides of each pit. His superiors worried about the "blast effects" in the battery's interior and the space Fisk allowed for ammunition storage. He was advised that the parapet needed to be raised for crew safety, and the firing room dispensed with. This latter change reflected differences of opinion among planners on how mortar batteries should function. The criticism was that mortars should be fired in the open. Then, Fisk's plans for a toilet inside the battery structure were met with skepticism. Three months later he resubmitted his plans with the appropriate changes.

From the very start Clark's mortars were only fired singly due to the horrible effects on crew members in the "emplacement rooms and passages." By 1903 "no salvos had ever been fired."

Within a year or so of Battery Clark's completion, some repairs and modifications were necessary. Rain found its way through cracks that extended into the shell and powder magazines. The fix was a huge job and the leaks were never completely eliminated. Soon after, a ventilation system was installed which was another major endeavor, having to work through the high sand berm and the heavy concrete ceiling.

Originally, ammunition was brought out to the mortars through openings in the pits, causing some of the discomfort for those

inside. The fix called for overhead rails to be extended to the rear of the battery so the ammunition could be brought out to the guns from the back of the pit. Then the pit openings were sealed off with ventilation windows installed. Several other improvements were made including a "mortar booth" for each pit. These were used to relay targeting information from the plotting room to the gun crews. This wave of reconstruction was finished by 1905.

A 12" mortar...If a guy is not watching these guns when they fire, it will knock him down. I have been knocked down by them 2 or 3 times & had my clothes unbuttoned slick as a whistle! The concussion does this.  
Daniel P. King, Fort Stevens

For several years the Corps of Engineers considered major changes for Battery Clark. Early on, it became apparent that having four mortars in such a confined space was unworkable and dangerous for the

crews. One thought was to narrow the parapet between the existing pits and lengthen it. Thus, the pits would be larger, provide a greater distance between mortars, and enable the pits to maintain four mortars each (drawing dated January 1913).

A second scenario called for the existing two pits to be enlarged with two mortars each. Then the fun began. On the left flank of Battery Clark an entirely new emplacement would be constructed with two more pits for two mortars each. In this manner eight mortars would still be available but with more space between them. This plan called for a plotting room to be built behind the original Battery Clark and a second one placed to the rear of the new construction (drawing dated January 1913).

For the third example, called the "revised plan," the engineers called for two mortars, mounted on the latest carriage design, to be set one behind the other, in each of two pits. This emplacement was more elaborate with a substantial addition to the rear of Battery Clark that included plotting and storage rooms. An elevated structure, thought to be the battery commanders station, was included (drawing dated December 1914). This design is reminiscent of features found at the Diamond Head, Hawaii mortar batteries

Well, as things go, nothing really significant materialized. Strategists decided that Battery Clark didn't have enough strategic value to undergo a major remodeling. So, the Army took the easy way out and merely removed the two forward mortars in each pit. By 1922 the orphans were emplaced in a new battery across the Columbia River, in Battery Gunther, which by the way, was troublesome and barely useful.

Had the strategists only known... On the night of June 21, 1942 a Japanese submarine surfaced and shot up the beach in front of Fort Stevens, the only USA coastal fort attacked since the War of 1812. Battery Clark was the only battery credited with placing the offender in its sights. For you see, that night Clark had STRATEGIC VALUE, was on duty, and was fully staffed. The Japanese figured out that Fort Stevens was the weakest fort on the Pacific Coast and took good advantage of it.

Col. John Mewha, who served in the Oregon National Guard, wrote a well-documented article covering the early experience of Oregon volunteers with the newly emplaced guns and mortars at Fort Stevens. In 1906 the first Oregon volunteers of the Third Infantry and the First Separate Battalion "reported to the Commander of Artillery of the Columbia for two weeks of active duty at Fort Stevens."

Sub-caliber practice took place on the “most sophisticated military equipment of the time,” Battery Clark. The men had little knowledge of the equipment, and the practice was so so, but it was a start. (Actually, some men were sent across the Columbia River to Fort Columbia.)

My job is to help on the trucks in getting shells to the gun. I think I will be able to pass 2<sup>nd</sup> gunners exam when I leave.  
D.W.L., Fort Stevens  
7-21-1916

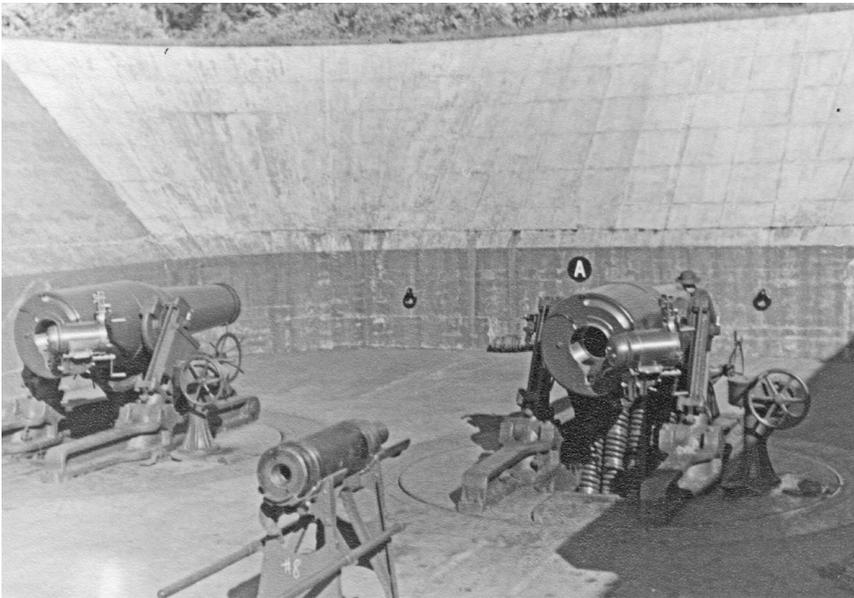
In 1908 the Oregon’s beloved 249<sup>th</sup> Coast Artillery had its start, although a bumpy one. The new unit, mainly from Astoria, Oregon “made twenty-seven percent hits out of three hundred shots of practice ammunition on the 12-inch mortar.”

Firing a mortar required “intensive training.” The detachments could not see their target as they were dependent on coordinates channeled by the plotting room from information delivered by observation posts (i.e., base end stations). Then, in order for the shell to achieve the correct arc and hit the enemy ship’s deck, the angle of fire had to be exact and could be no less than 45 degrees. The slightest error would, “cause a

deviation of hundreds of feet from the target,” (keep this in mind for later on in the story).

Throughout the late 1920’s and 1930’s, the 3<sup>rd</sup> Coast Artillery, regular Army, served as caretakers of the Harbor Defenses of the Columbia. During those days the “in-service armament” was Battery Pratt, a six-inch disappearing rifle, best suited for covering the inner harbor. Battery Russell and Battery Clark were dormant except for the annual practices conducted by the Oregon National Guard’s 249<sup>th</sup> Coast Artillery regiment. With world conditions deteriorating, Battery F, 3<sup>rd</sup> Coast Artillery, was activated in late 1939. Soon after Battery Clark joined Battery Pratt as an in-service armament, thus adding broad coverage outside of the harbor.

On that fateful day, September 16, 1941 President Roosevelt Federalized the National Guard. After a miserable winter at Camp Rilea, the 249<sup>th</sup> Coast Artillery arrived at Fort Stevens to join the others. Battery A, largely from Klamath Falls, Oregon was assigned to Battery Clark. They prided themselves in excellence. During a firing practice at Clark during April 1941, just months before Federalization, Battery A rated “E’s” for excellence. Reproduced below is a clipping from an unidentified newspaper:



The photo is from mid 1941 at Battery Clark, Fort Stevens, Oregon during a practice by the Oregon National Guard, Battery A, 249<sup>th</sup> Coast Artillery. This was prior to Federalization of the National Guard in September of that year. During this period professional photos of Clark were taken, some for newspapers. However, the one shown here is believed to have been taken by a Battery A guardsman. The photo nicely illustrates the position of the gun for loading and the truck behind it with a shell ready for loading. What’s missing is the detachment of men needed to actually load the gun with the shell and powder. It appears that maintenance tasks are being done.  
(Fort Stevens State Park photo archives)

### ***Btry. A, 249<sup>th</sup> Rates “Es”***

On April 6, Battery A fired service and made an excellent rating, firing a score of 106.15. It is the highest score made in the Harbor Defenses of the Columbia for 1941 and the only battery entitled to the privilege of wearing the red E’s on the right sleeve, their designation of excellence.

First Lieutenant Zed Harris was battery commander and in charge of firing with Second Lieutenant George Sargent in immediate charge of the gun crews; Second Lieutenant William Delzell in command of the range section; Sergeant Hall, pit commander; Sergeant Coffman, in charge of ammunition; Sergeant Baker at the B.C. scope; Sergeant Sanders plotter; Sergeant Alter, spotting board; Sergeant Hayden B-1 observer; Sergeant Wauchope, in charge of mortar one, and Sergeant Linville in charge mortar two.

So again in 1941 another laurel is added to the honor roll of Battery A.

**Coast Artillery Trivia.** Coast Artillerymen were sometimes called *Cosmoline Soldiers*. Cosmoline, a heavy oil, was liberally applied to preserve coastal guns. A very messy job!

As already alluded to, Battery A was on duty at Battery Clark when the Japanese submarine attacked Fort Stevens in 1942. The Harbor Defenses of the Columbia commander made a good choice. The offender was in their sights. Sadly, the commander didn’t let the men to do what they were well trained to do. Even so, soon after the attack strategists determined that 12-inch mortars were no longer useful at either Fort Stevens or the fort across the Columbia

River (the same decision held for most other mortar batteries in the Coast Artillery arsenal). The reason given harkens back to the beginning: That mortar crews had to move fast to adequately track a ship and fire shells with the expectation of hitting the target. Modern ships moved much faster, making reliance on the mortar problematic. The men of Battery A were released and assigned to areas that were short of manpower.

Sources: A number of internet sources were consulted. Battery A, information came from the Fort Steven State Park archives. Books by Mark Berhow, Raymond Lewis, & Marshall Hanft were consulted, an article by Col. John Mewha from the Fort Stevens State Park collection was useful, and the unpublished manuscript: General History Harbor Defenses of the Columbia was consulted.

## CHANGING OF THE GUARD AT THE FRIENDS OF OLD FORT STEVENS

Jim Forst, the longtime FOOFS Store Manager and Board Clerk, recently retired. He held the position for fifteen years. That hardly seems possible, but time passes by quickly. He was noted for his calm approach to visitors' questions and comments under all manner of conditions. Park hosts who worked at the FOOFS gift shop were always appreciative of his help and knowledge of FOOFS and Fort Stevens State Park procedures and practices. Pleasing two masters can be complicated at times. Before coming to FOOFS he was a feature writer for the Oregon Coast magazine, so he knew his way around such folks. Jim had good relations with the local press and knew the best way to help FOOFS with advertising for special events. The FOOFS store manager has lots of things to keep track of, including the special events. Special events always bring increased visitation, more questions, and more problems. The largest one is always the Labor Day Civil War reenactment. During these times, Jim deftly handled questions and concerns from a multitude of directions: Again always calm, always polite, and always efficient. Jim will be missed. Good luck Jim!

All was not lost! When Jim announced his retirement, the FOOFS personnel team got to work

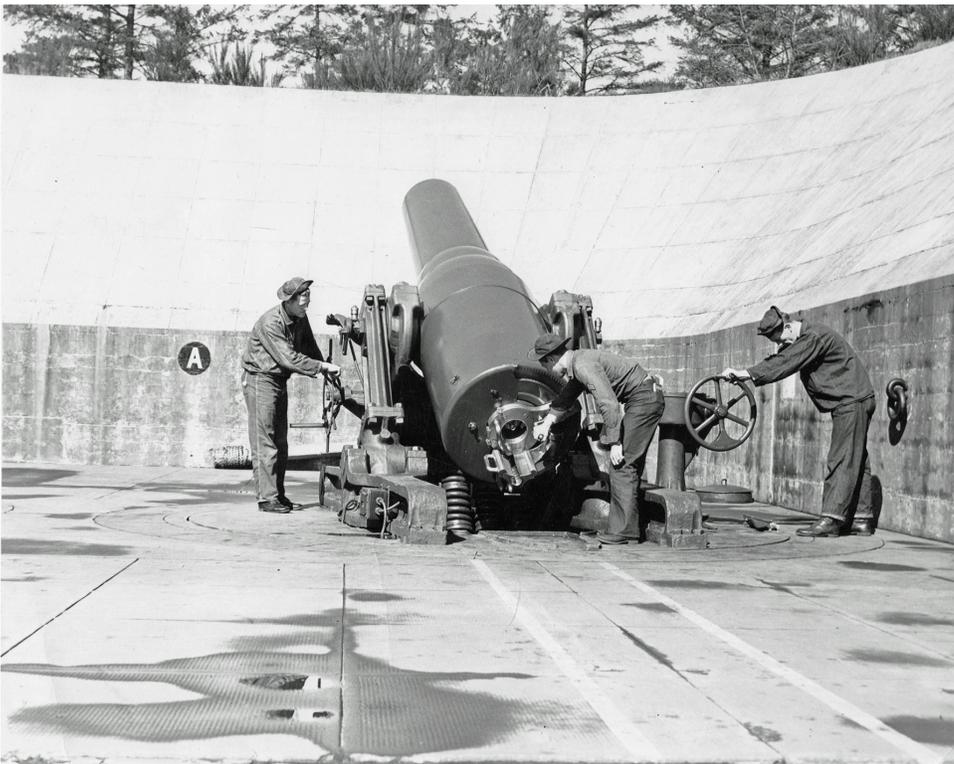
while his wife, Diane, served as the interim store manager/board clerk. Good candidates applied and interviews were conducted. One candidate emerged as the best suited for the Friends of Old Fort Stevens, and the FOOFS directors unanimously voted to hire Laura Neal.



Laura Neal, FOOFS Store Manager

Laura holds a bachelor of science degree in environmental science from Iowa State University. She has recent experience working for Oregon State Parks as an interpreter while taking part in several park training programs. Her park work required her to do a good deal of planning. FOOFS was looking for a manager who was adept at

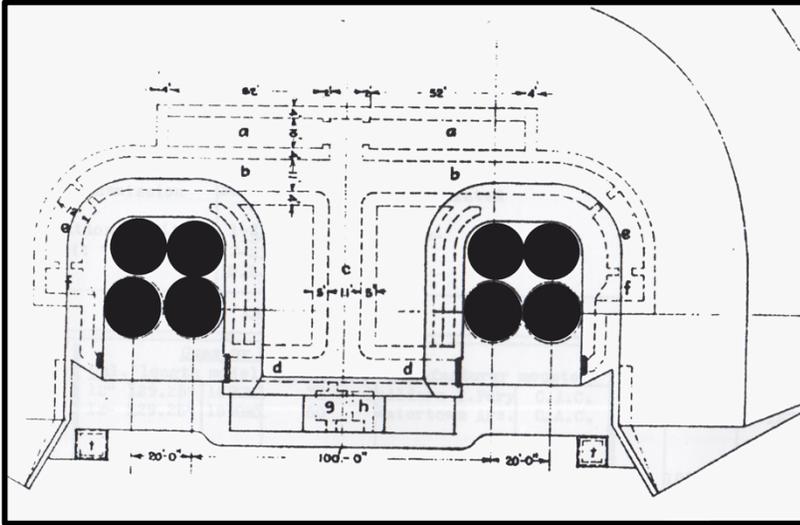
speaking to groups and making presentations. Now days sometimes sufficient personnel are not available to do these things, and Laura is just the one to pitch in. Laura is undergoing training in the ways of FOOFS and will soon be on her way. Congratulations Laura!



Battery Clark, Fort Stevens, Oregon

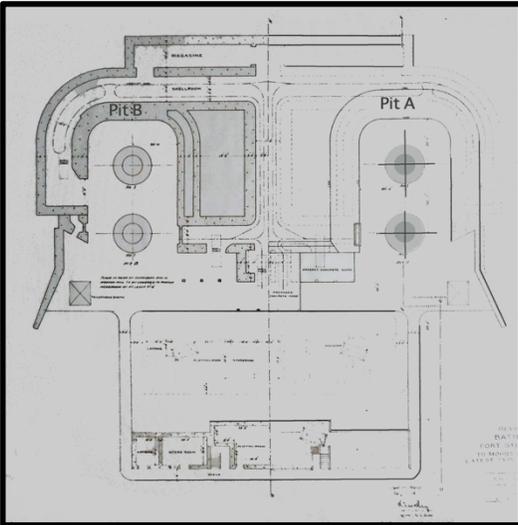
Circa 1941

### The Development of Battery Clark A 12-Inch Mortar Battery Fort Stevens, Oregon



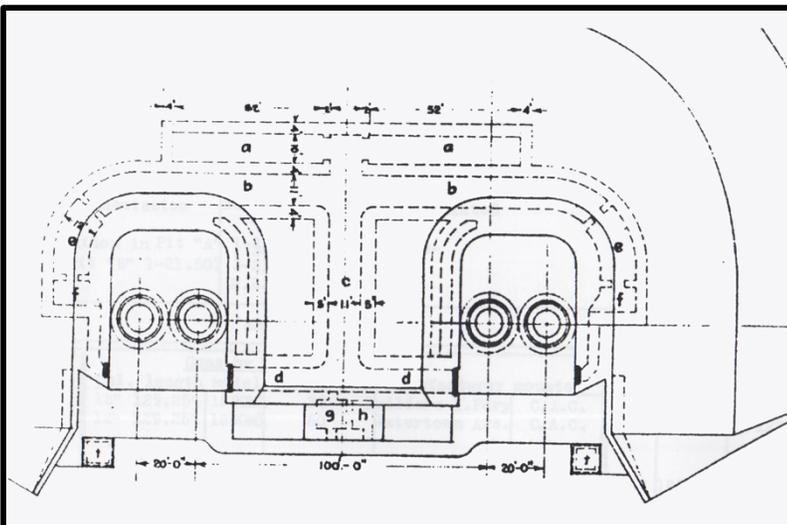
1899

This diagram is modified from the original to demonstrate how four mortars were originally clustered in the two pits or quads. The extreme outside of the black circles indicates the outer edges of the well housing the mortar carriages.



December 1914

After several attempts, this drawing represents the final design discussed for modernizing Battery Clark. It featured two of the latest carriages aligned one behind the other, thus giving adequate space for the detachments working the guns. Pit A appears to be in its original form while Pit B has been modified to provide larger service rooms. The drawing is vague on the purposes of the extension to the rear of the battery. It appears that a raised battery commander's station was being considered. In any event, after 1915 the Corps of Engineers cancelled the whole idea of modernizing Battery Clark.



1922

The ultimate decision was to simply remove the two forward guns from both pits and transfer them to a new emplacement across the Columbia River at Fort Canby. All this was accomplished in 1921-22.

The top and bottom drawings are from what are called Records of Completed Works. They are in the public domain. The middle drawing is based on a document in the Fort Stevens State Park archives.

## Fort Stevens Review Insert, Winter 2017

### Battery Clark, A 12-inch Mortar Battery

(Unless noted, photos from the Fort Stevens State Park archives)



Original mortar configuration: Four mortars in each of two pits. Due to crowding, by 1922 two mortars from each pit were moved across Columbia River.

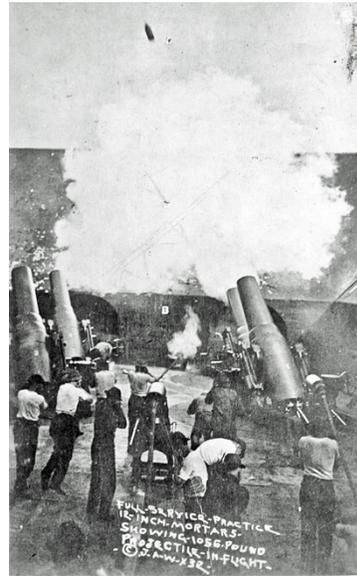


Photo reveals the firing of a mortar in a pit with a four mortar configuration. Talbot, from whose collection it came from, served in both Puget Sound forts and at Fort Stevens. Can't be sure the photo was taken at Fort Stevens, but it nicely shows the original pit configuration. The caption indicates that the shell weighed over a thousand pounds.



This photo of Battery Clark was taken after 1922 when the two forward mortars from each pit were removed and emplaced across the Columbia River at Battery Gunther, Fort Canby.



The effort needed to load ammunition into the 12-inch mortar is nicely shown here. The plan was to have similar detachments for each gun. This photo was taken at Battery Gunther, Fort Canby.

#### Particulars for the 12-inch mortars emplaced at Battery Clark

Mortar barrel: 1890M1, 12-inch

Carriage: 1896M1

Combined weight: 71.2 tons

360-degree traverse

Elevation range: 45 to 67 degrees

Projectiles (shells)

12-inch 700 pounds

12-inch 1,046 pounds

3-inch sub-caliber for practice

Powder packed in small units, then clustered for the amount needed to propel the shell the desired distance. 55 to 65 pounds was the standard.

Range: Minimum 2 miles. Maximum 8 miles

Breach pressures: 55,000 psi



The gun detachment is shown loading the shell into the 12-inch mortar. The soldier to the left is holding demonstration powder bags for loading to follow the shell insertion. The soldier to the right is most likely the pit commander. This is a staged photo. The Fort Stevens crews wore the more traditional uniforms as seen in the photo above. Note the second mortar in the upper left of the photo.

(Photo, Rand McNally, 1943 supporting *Infantry Journal* Prisoner of War Fund)