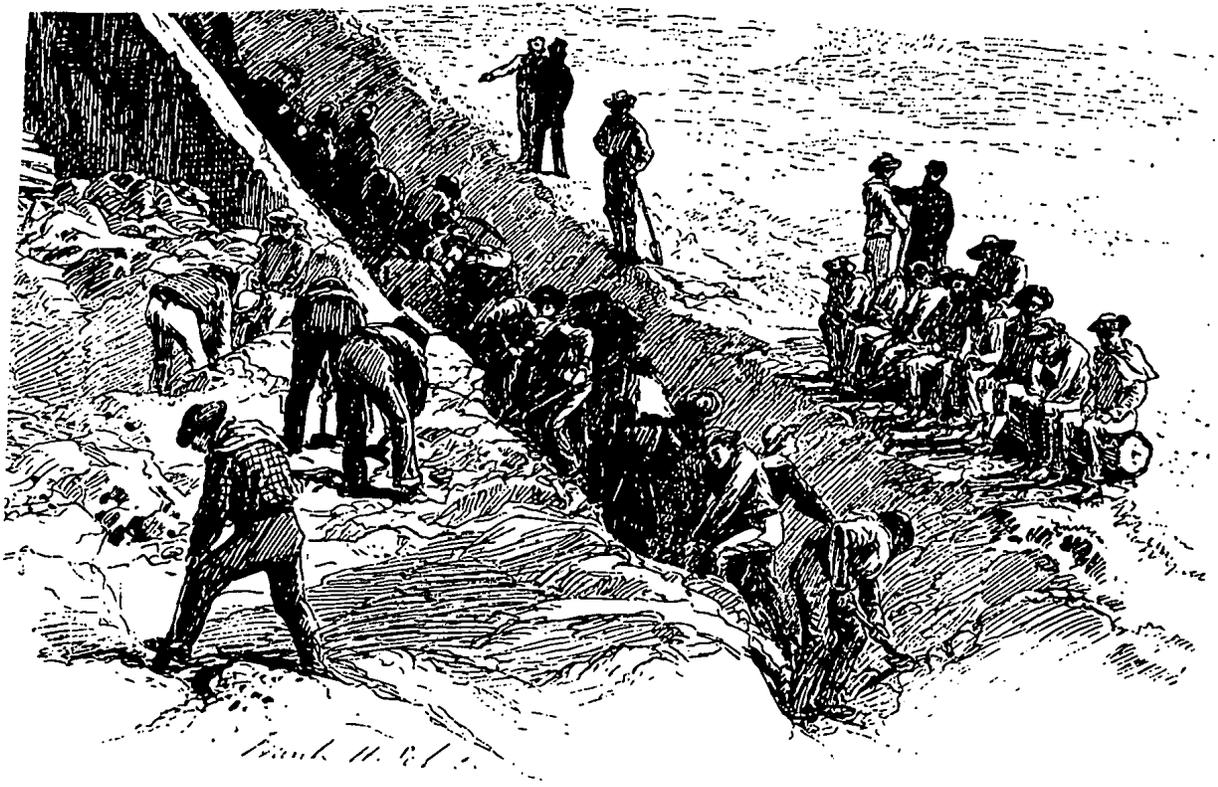


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ARCHEOLOGICAL EXCAVATIONS IN THE WATER BATTERIES



AT FORT DONELSON NATIONAL MILITARY PARK

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**ARCHEOLOGICAL EXCAVATIONS IN THE WATER BATTERIES
AT FORT DONELSON NATIONAL MILITARY PARK, TENNESSEE**

by

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Division of Archeology

Office of Archeology and Historic Preservation

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ABSTRACT

Excavations in the Spring of 1968 revealed previously undocumented construction details about the Fort Donelson Water Batteries which can be used in their restoration. The location of eight of the twelve guns in the batteries was fixed, the other four apparently having been destroyed by erosion or recent developments in the area. Guidelines are suggested for the maintenance and stabilization of the area until restoration can take place.

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INTRODUCTION

This report has three objectives: (1) to record the archeological excavations conducted at the Fort Donelson Water Batteries; (2) to provide data for an accurate restoration of the external appearance of the batteries; and (3) to suggest maintenance guidelines for the upkeep of the batteries prior to their restoration.

The brief but violent history of the water batteries at Fort Donelson, Tenn., has been compiled by Edwin C. Bearss (1968) and will not be reiterated here. This report and the accounts of Captain Reuben Ross and Frank Smith, along with McPherson's official map and the sketches of H. Lovie and A. Simplot which appeared in Harper's Weekly and Frank Leslie's Illustrated Newspaper, provided many of the details of construction of the batteries.

Archeological excavations were conducted from April 29 to May 29, 1968, with a local crew of laborers (fig. 1). Superintendent E. J. Pratt, Administrative Officer Carlon Sills, Park Guide Don Adams, and Maintenance man J. T. Jackson assisted the investigation in numerous ways through administrative support, equipment, and enthusiastic interest.



Figure 1.--Excavations in the Upper Water Battery.

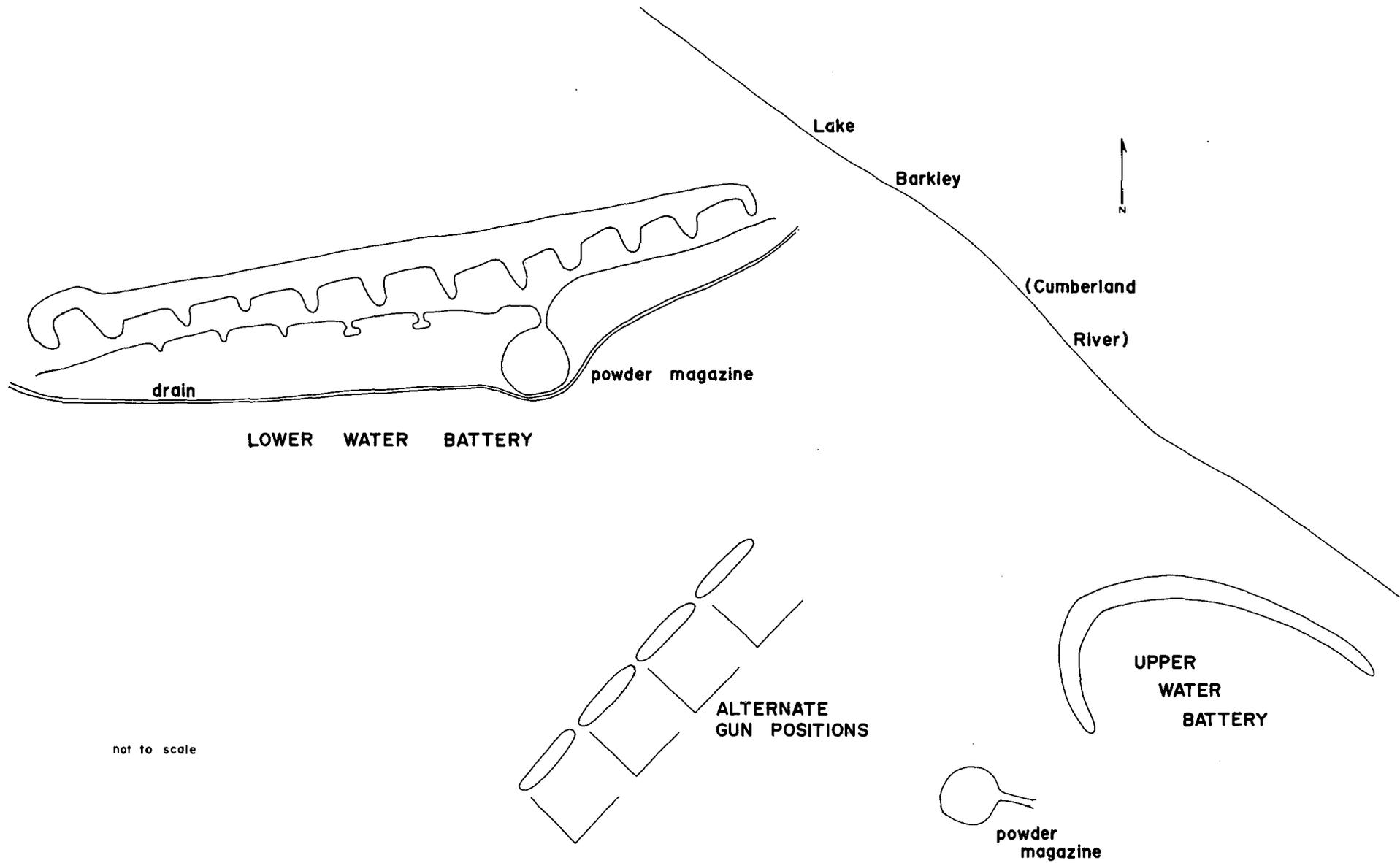
Original Condition

From a restoration point of view, one unexpected difficulty arose. The works were being constantly improved when the Federal gunboats appeared and began blasting them apart. In fact, the eye-witness accounts indicate that, had the battle been postponed, bomb-proof casemates would have been added to the works. The restoration recommended here will be based on the condition of the batteries on the morning of February 14, 1862.

Historic Documentation

Lower Water Battery

Eleven gun positions were carved out of the end of a low ridge extending from the Fort proper to the juncture of Hickman Creek and the Cumberland River. These have been numbered 1 through 11, from right to left (fig. 2). Dirt was removed from the hillside and piled up to form a straight parapet and twelve traverses to protect the guns (fig. 3). A communications trench ran along the rear of the battery to connect the gun positions and provide access to a powder magazine behind Gun Position 5. Because of the configuration of the ridge, Gun Positions 1 to 5



4

not to scale

Figure 2.--Diagrammatic Sketch of the Water Batteries.



Figure 3.--View along the Lower Water Battery, looking South.

are stepped up the steep hillside from the bank of the Cumberland, while Gun Positions 6 to 11 are on the other side of the ridge where the slope is more moderate. A drainage ditch was cut into the hill a few feet behind the gun positions, arcing above the magazine and ending beyond the flanks of the battery to catch any runoff from the ridge. Although the exterior of the parapet formed a straight line, it angles slightly across the ridge so that the gun positions were offset with the left corner of each being slightly behind the right corner of the position to its left.

Of the battery, Captain Ross wrote:

... General Pillow had promised to have the guns protected by bombproof casemates, but they were not yet constructed and the battle was hourly expected... Arriving at the river I found the defenses were as follows: First and lowest down an 8-gun battery of 32 pdrs, with a 10-inch Columbiad on the left of them. These were placed in a strong but rough seige battery, with natural earth traverses mostly revetted with hurdles of sapwood, capped between embrasures with sandbags, the embrasures lined as usual with rawhide. There were no bombproofs or roofs of any kind...One of the 32 pdr. guns were dismounted early in the action, by which Captain Dixon was killed before the main bombardment came on...A cannonball entered the embrasure near which he happened to be stationed and knocked off a cheek /of the gun carriage/, from which a screw bolt flew out and killed him....(Ross 1897)

General Lew Wallace has left brief accounts of the water batteries and their conditions, probably pieced together from the accounts of others rather than personal inspection. His autobiography makes no mention of visiting the water batteries and his account is replete with events he could not possibly have witnessed.

... There were two water-batteries sunk in the northern face of the bluff, about thirty feet above the river; in the lower battery 9 /8/ 32-pounder buns and 1 10-inch Columbiad, and in the upper another Columbiad, bored and rifled as a 32-pounder, and 2 32-pounder carronades. These guns lay between the embrasures, in snug revetment of sand in coffee-sacks, flanked right and left with stout traverses (Wallace 1956:402).

... When the vessels were out of range, the victors looked about them. The fine form of their embrasures was gone; heaps of earth had been cast over their platforms. In a space of twenty-four feet they had picked up as many shot and shells.... (Wallace 1956:414).

A cross section of the water battery (McPherson 1875) shows the parapet to be over 16 feet thick at the base and 9 feet thick at the top. It was 4 feet high on the interior, with a 96° interior slope and 40° exterior slope. The top of the parapet sloped 8° away from the gun position. The interior of the parapet was revetted with hurdles of sapwood, planks, and probably sandbags. Sandbags were piled on top of the parapet to raise its height to 6 feet, leaving narrow embrasures. The width of

the embrasures is not known but was probably from 3 to 5 feet except for Gun Position 11, which must have been wider due to the traverse characteristics of the Columbiad. The sandbags were covered with rawhide at the embrasures to prevent them from catching fire. Chief Engineer Gilmer, in charge of fortifying Fort Donelson, reported:

February 3 /1862/ we went over to Fort Donelson... It was also important that better protection should be made for the heavy guns (mounted for the defense of the river) by raising the parapet with sand bags between the guns to give greater protection to the gunners....(Gilmer 1882a:133).

On February 10th he reported,

... We are making herculean efforts to strengthen our parapets--making narrow embrasures with sand bags, and if we can have ten days we hope to make bomb-proofs over the guns....(Gilmer 1882b:869).

General Pillow adds:

... No more than three boats could possibly bring their guns to act upon our position at once. This makes the field of fire required for the guns so very narrow, that it admits of the construction of very narrow embrasures, which we are now constructing....(Pillow 1882a:870).

... I am pushing the work on my river batteries day and night; also on my field works and defensive line in the rear. In a week's time, if I am allowed that much, I will try very hard to make my batteries bombproof. I am now raising the parapets and strengthening them....(Pillow 1882b:870).

The gun positions were 20 feet from parapet to back wall and were flanked by traverses revetted like the parapet and

capped with sandbags. There is no record of the width of the gun positions, the thickness of the traverses, and the width of the communications trench, which separated the traverses from the back wall.

Several feet behind the battery a drain was cut which paralleled the battery except where it arced behind a powder magazine. It emptied beyond the flanks of the battery.

The 10-inch Columbiad was mounted on the extreme left, on a centre-pintle chassis. This would be Gun Position 11. The other ten positions were occupied by eight 32-pounders. Excavation showed that seven of these were mounted on front-pintle chasses and the other on a centre-pintle chassis. Simplot (1862) showed four guns in Gun Positions 1 to 4 and Lovie (1862) showed seven guns in Gun Positions 1 to 7. A few accounts speak of nine 32-pounders and it is not clear whether these count the disabled gun which killed Captain Dixon. However, Ross (1897) is explicit that "... when the fleet attacked there were only seven 32's, the 10-inch Columbiad and the rifle that could return their fire,..." One of the problems, then, was to determine which positions held guns.

Except for the types of chasses, there is no clue in the historic record as to the construction of the gun platforms.

Upper Water Battery

Captain Ross, commander of the Maury Light Artillery which manned the Upper Water Battery, wrote:

... The upper battery was a barbette battery without any traverses. During the several nights of the action embrasure's were made and greater safety secured by filling in between muzzels with sandbags. This battery contained two 32-pdr. seacoast howitzers, which were of no use whatever in the action, ... /These are elsewhere referred to as carronades and there was also a 6.5-inch rifled Columbiad mounted on a centre-pintle chassis./.../During the battle/ the bombardment was terrific, one shell cutting off the rear of a casemate carriage within ten feet of the epaulment, another bursting within the Fort so as to throw earth quite all over us....(Ross 1897).

Another account adds this detail:

... his third shot /Federal Gunboat's/ hit about four feet below the rifle making a hole big enough for a mule to go in...(Smith n.d.)

This was probably an exaggeration although such a hole exists there today.

The parapet around the guns was semicircular (fig. 2). Bearss (1968:47) gives its length as 50 yards, but 70 yards would be more nearly correct if the parapet were measured around the center. Parapet dimensions are the same as for the Lower Water Battery. Bearss (1968:47) states that the interior slope "was revetted with sapwood facines." On the other hand, Lovie's sketch (1862) shows the revetment to be planking held up by

posts spaced 3 to 6 feet apart. Ross (1897), referring to the lower battery, said that it was "...mostly revetted with hurdles of sapwood." This implies either that all of the battery was not revetted or that other methods were used in addition to hurdles. Planking would have been available, and we suggest that Lovie's sketch is accurate enough in other respects to be trusted in this matter.

Coffee and cotton sacks filled with sand were added to the top of the parapet for greater protection. No dimensions are given but, judging from the height of the parapet in Lovie's sketch, the merlons were 2 feet high and the embrasures 5 feet wide. The sandbags were lined with rawhide, which was kept wet to prevent them from catching fire.

A 6.5-inch rifled Columbiad was mounted on a centre-pintle chassis in the middle embrasure. Two 32-pounder carronades were mounted in the flank embrasures on front-pintle chasses. Ross refers to a casemate carriage in his description of the battle but he probably meant a front-pintle barbette carriage. All descriptions refer to the guns as mounted on barbette carriages, either front or centre-pintle. (Note: A casemate carriage was designed for use in embrasures with overhead protection, whereas a barbette carriage elevated the gun to fire over the parapet. The embrasures at Fort Donelson were added as an afterthought.)

Present Setting

The Lower Water Battery lies in open woods which extend forward of the position about 50 feet (fig. 4). Beyond this is a grassy slope leading down to the waters of Lake Barkley. To the left is moderately heavy woods, and to the right is the lake. In the rear, the ground is a grassy field sloping up to Fort Donelson on the summit, broken only by a small clump of trees around the alternate gun positions and the parking area.

The Upper Water Battery has the appearance of a forest glen (fig. 5). Large trees, 75 to 100 years old, tower over the battery and shade it. The hill behind the battery is steep and covered with brush and trees and there is a carpet of leaves on the ground. To the left is a wooded hillside and a powder magazine; in front is the parking area wall, a grassy slope, and the lake; and to the right lies the lake.

Intrusions

Lower Water Battery

This battery is remarkably undisturbed by intrusions. There is a parking area flanked by a stone wall but, because the focus of attention is in the other direction, it is not distracting. The



Figure 4.--View from in front of the Lower Water Battery.



Figure 5.--View from the left of the Upper Water Battery.

gravel walk leading down from the parking area into the battery is unobtrusive.

A stone audio station and bench behind the battery do spoil the scene and would be even more prominent were the trees to be removed. In 1937 the powder magazine for this battery was excavated and restored. Were it in good condition there would be no problem, but erosion has exposed about 1 foot of the concrete-lined tunnel within the battery. The ventilator shaft on top is not original and is made most evident by the erosion around it.

Several years ago, a drainage ditch was cut through the parapet at Gun Position 10 to provide an outlet for water running into it. A hole was dug by the Army in Gun Position 11 to remove four L-shaped iron bars. It was never filled in except by leaves.

Upper Water Battery

In 1916 the Corps of Engineers built a lock and dam just upstream from the Upper Water Battery, and while not intruding on it, nevertheless contributed indirectly to the erosion of the parapet. The right end of the parapet overlooked the lock and became a favorite place for sightseers to stand and watch boats go through. Access for workmen to the lock was apparently through the center of the parapet. This hole was probably

initiated by a shell during the battle and completed by erosion so that by the time the workmen started using it, it was already the lowest point in the parapet. A set of stone steps put in by the Park Service some years ago now leads down from the parapet at this point and has stopped further erosion.

A gravel walk was built into the battery from the parking area by the Park Service. In constructing this walk, approximately 20 feet of the parapet's left flank was graded away.

A picnic area was once located in the battery but has since been removed. The parking area, and especially the stone wall along the lake side, dominate the view from the battery.

The construction of Lake Barkley has raised the water level of the Cumberland River but, more importantly, the lock and dam next to the battery have been removed except for a floodlight mounted outside the right center of the parapet.

Several Corps of Engineers buildings on the hill behind the battery have been acquired by the Park Service and will be razed.

Present Condition

Lower Water Battery

The parapet is in fair condition despite serious erosion in places. The top is worn by a trail which extends along its length

from Gun Position 3 to Gun Position 10. On some of the slopes this trail has led to erosion. The worst hole in the parapet is between Gun Positions 10 and 11 where the drainage ditch behind the battery is blocked and has removed about 10 feet of the parapet. Other erosion gullies have cut through Gun Positions 4, 6, 8, and 10. These were probably started by shell explosions during the battle except for Gun Position 10 which was cut by the park maintenance crew some years ago.

The traverses are in good condition except for trail erosion. Most of this will require only revetting of the sides and removal of stumps. The traverse between Gun Positions 1 and 2 has largely eroded away.

The gun positions have filled with wash from the parapet, traverses, powder magazine, and the hill behind the battery. The depth of the fill varies from 13 to 41 inches. A hole was dug by soldiers from Fort Campbell in the center of Gun Position 11 to remove some iron bars. This has partially filled in with leaves.

The communications trench has become a gully in places. The drainage ditch behind the battery has been filled or blocked in several places, diverting water into the battery at Gun Positions 2, 5, 10, and 11 and through the communications trench or the holes in the parapet.

The powder magazine has suffered greatest from erosion. Most of this is attributable to visitor traffic down its steep sides. The face of the magazine next to the battery has washed away 2 feet or more.

Upper Water Battery

The left and right flanks of the parapet are scarcely visible and there is a hole in the center of the wall leading to a flight of stone steps. The area within the battery is level. The hillside behind is generally stable except for trails which are channels for erosion. The old gravel walk leading down from the parking area is badly eroded, and the culverts are choked with brush and leaves, aggravating the erosion problem. Off the left flank of the battery and cutting between it and the upper powder magazine is a narrow brush-filled ravine.

ARCHEOLOGICAL EXCAVATIONS

For the sake of clarity, the work done in each gun position and elsewhere in the Upper and Lower Water Batteries will be described separately. Measurements of the parapet and traverse heights are subject to error due to the difficulty (caused by erosion) of determining where the base of a wall ends and the surface of a gun position begins. Depth of the floor is measured from the surface near the center of each position; this depth being the amount of fill which has accumulated since the batteries were abandoned. The base soil in all of the excavations is a red clay hardpan except in Alternate Gun Position 4, where it is an orange-brown clay hardpan. The fill in all cases is a brown loam with silting lenses indicating water-laid deposits due to erosion.

Two terms which will constantly be referred to are sleepers, which were wooden timbers embedded in hardpan and used to anchor the gun platform, and traverse planks, which were nailed to the sleepers as a traverse rail. As will be seen, these usually constituted the only remains found and platforms as such rarely existed. As a result, these will be called traverse arcs rather than platforms.

Directions, such as front, rear, left, etc., are given with reference to a person standing in a gun position and facing the parapet. The parapet, for example, is in front of the gun position.

Artifacts are listed for each position and consist mostly of hand-wrought iron nails and spikes, brass friction primers, and shell fragments. Photographs of the major finds are included in Appendix 1.

A backhoe removed sterile fill in the few positions in which it could be employed. Otherwise, all excavation was done by hand. All excavations were backfilled to protect features and eliminate the safety hazard of open pits.

Lower Water Battery

Gun Position 1 (fig. 6)

A 10-foot square and a 5-foot square were opened in this position. The left traverse has eroded into the position, making the surface considerably higher on the left and, more importantly, sealing off the floor with a thick layer of red clay and rocks.

Portions of seven sleepers were defined in the clay hardpan floor at a depth of 28 inches from the surface. Two of these

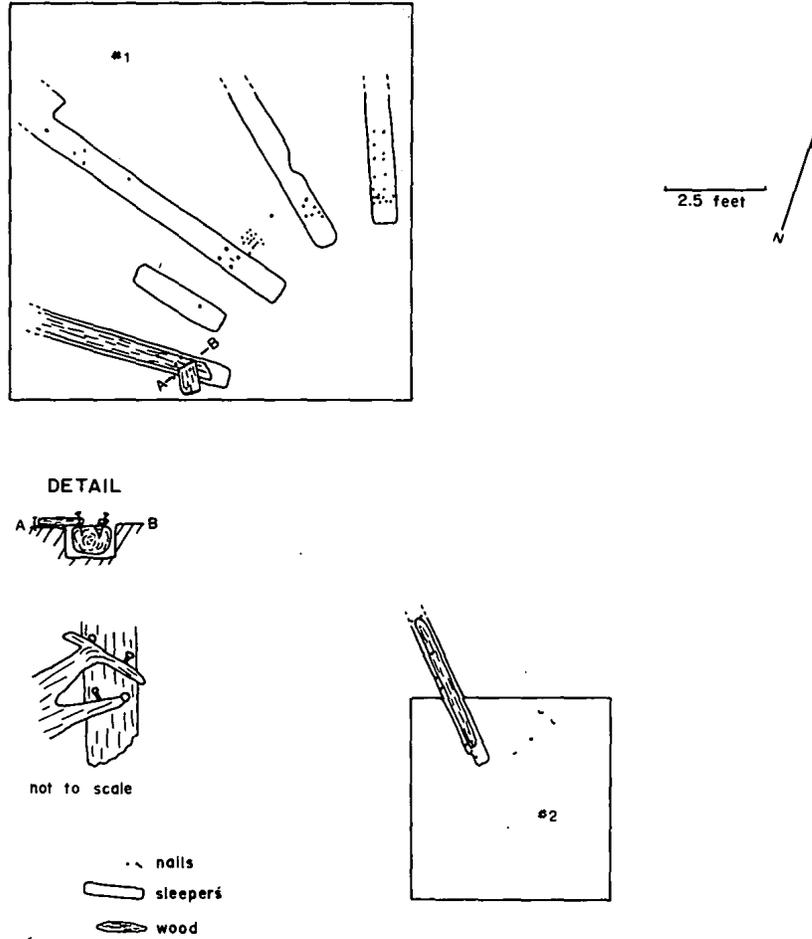


Figure 6.--Ground plan of excavations in Gun Position 1.

sleepers still contained well preserved timbers and all but one had a large number of nails driven into them. One of the timbers still had a part of a 6-inch-wide traverse plank over it, held in place by four large iron spikes. Concentrations of other spikes and nails suggested the location of other traverse planks.

The seven sleepers formed part of a circle indicating a centre-pintle chassis with a diameter of 6 feet. This does not agree with Simplot's sketch (1862) of this gun position but is certainly practical from a military point of view since it enabled this gun to shoot upriver as well as down.

Artifacts found include:

2 sleepers and fragments of a traverse plank.

101 iron nails and spikes.

2 iron rings, 6 inches in diameter, from stands of grape shot.

1 iron center bolt from a stand of grape shot.

1 brass friction primer (discarded).

4 iron plates or crushed buckets (two in the fill).
One of these has a handle and two others are folded pieces of metal suggesting a container.

2 clear glass bottle necks.

Gun Position 2 (fig. 7)

The first 5-by-5-foot square in this position did not uncover anything. A second was opened next to it and expanded until it

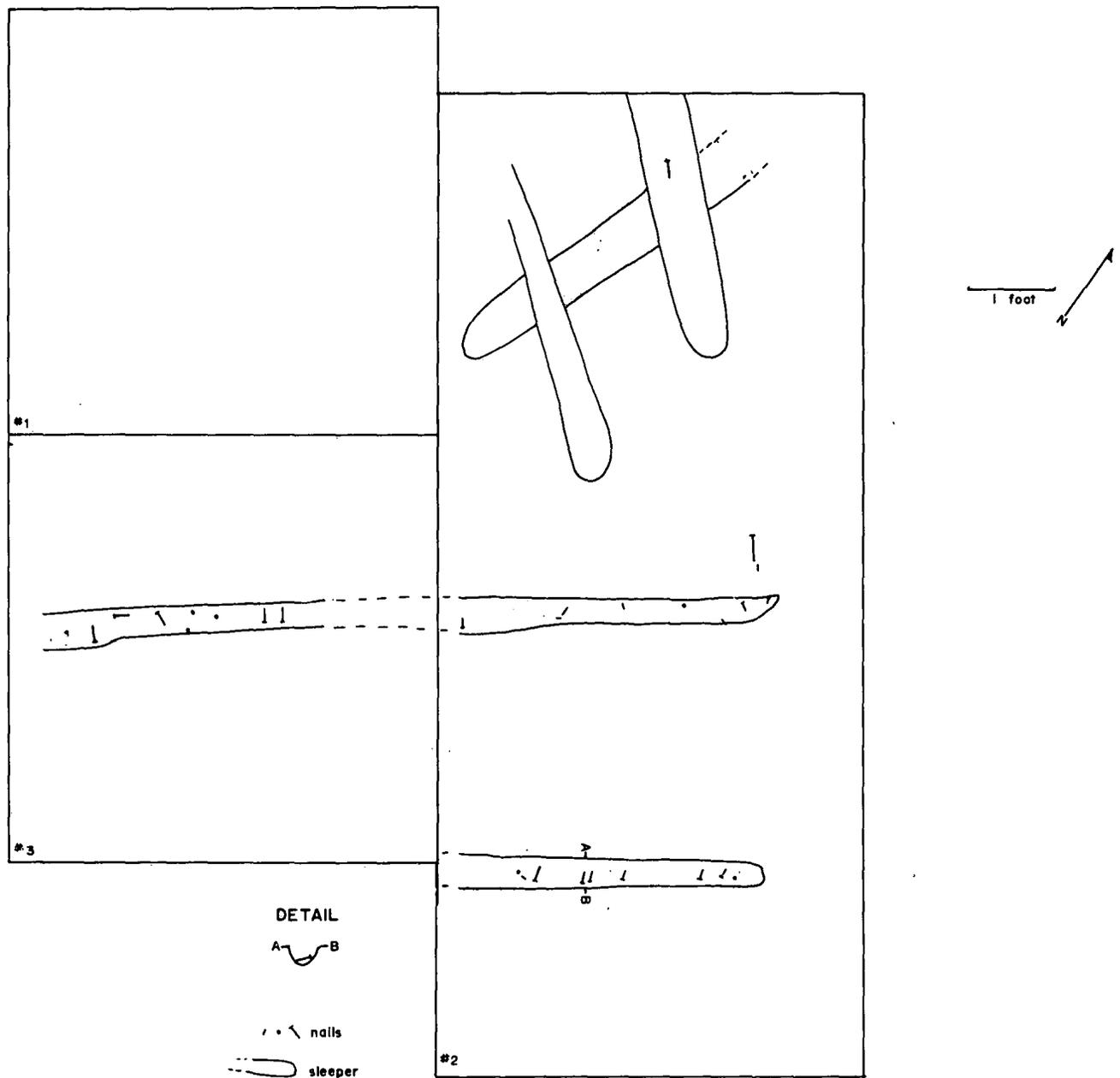


Figure 7.--Ground plan of excavations in Gun Position 2.

measured 5 by 11.5 feet. A third 5-foot square completed the excavations in this position. The floor was defined at a depth of 21 inches below the surface and was abnormal in that it consisted mostly of fill earth except near the back of the position. Apparently this position was too far forward on the hill for the Confederates to dig it into the hardpan like the others, and they had to dump considerable fill on the hillside to level the position. The remains found are also unique, consisting of five logs laid as sleepers to which planks were apparently attached. Two were laid across the back of the position and two were laid in front at an acute angle with the fifth log underneath. The latter three logs were difficult to trace due to the nature of the soil. A suggestion of a pit was found near the right traverse but may have been a load of darker earth. This is the only position having an actual gun platform. It was probably necessary to distribute the weight of the gun as much as possible to keep it from sinking into the fill. The gun was probably mounted on a front pintle. Another indication of a platform is the lack of debris on the floor of this position except for nails in the sleepers.

Artifacts found include:

- 34 iron nails and nail fragments.
- 5 brass friction primers.
- 2 unidentified iron objects.

Gun Position 3 (fig. 8)

Two 3-foot-wide trenches were cut in at right angles through the center of the position. The original floor was found 13 inches below the present surface and is composed of red clay hardpan. Approximately 12 feet behind the parapet lay a soft dark area which proved to be a portion of a traverse arc with two sleepers. One sleeper was apparently braced against a post to the rear of the traverse arc. No front pintle was found, but the area where it should have been had a large number of rocks which might have been placed as a base for one. This was definitely the remains of a front-pintle traverse arc.

Artifacts found include:

- 16 iron nails and spikes.
- 1 brass friction primer.
- 1 base of a white-glazed stoneware jug.

Gun Position 4 (fig. 9)

A 5-foot-wide trench was run lengthwise through the center of the position and later expanded to the left traverse near the center of the position. The floor was a red clay hardpan at a depth of 22 inches.

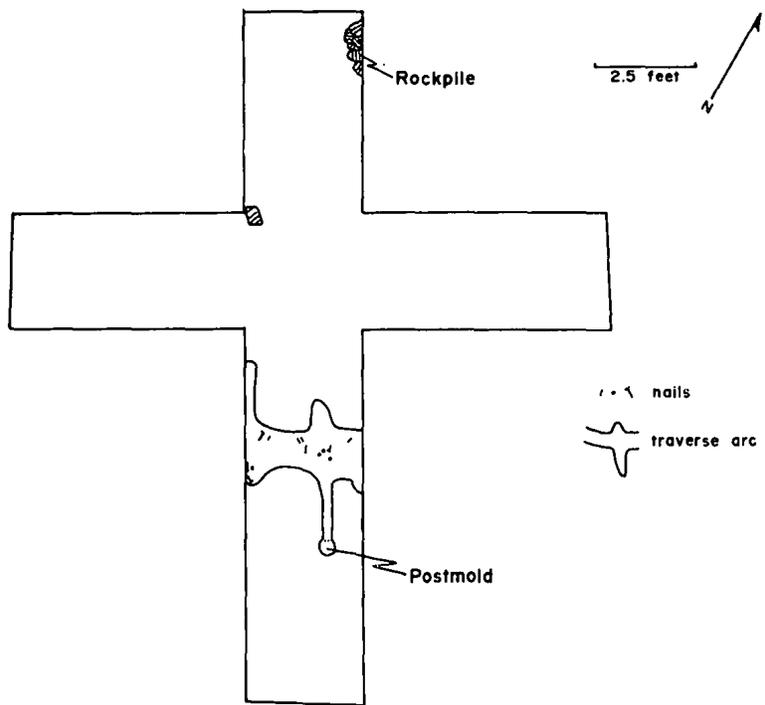


Figure 8.--Ground plan of excavations in Gun Position 3.

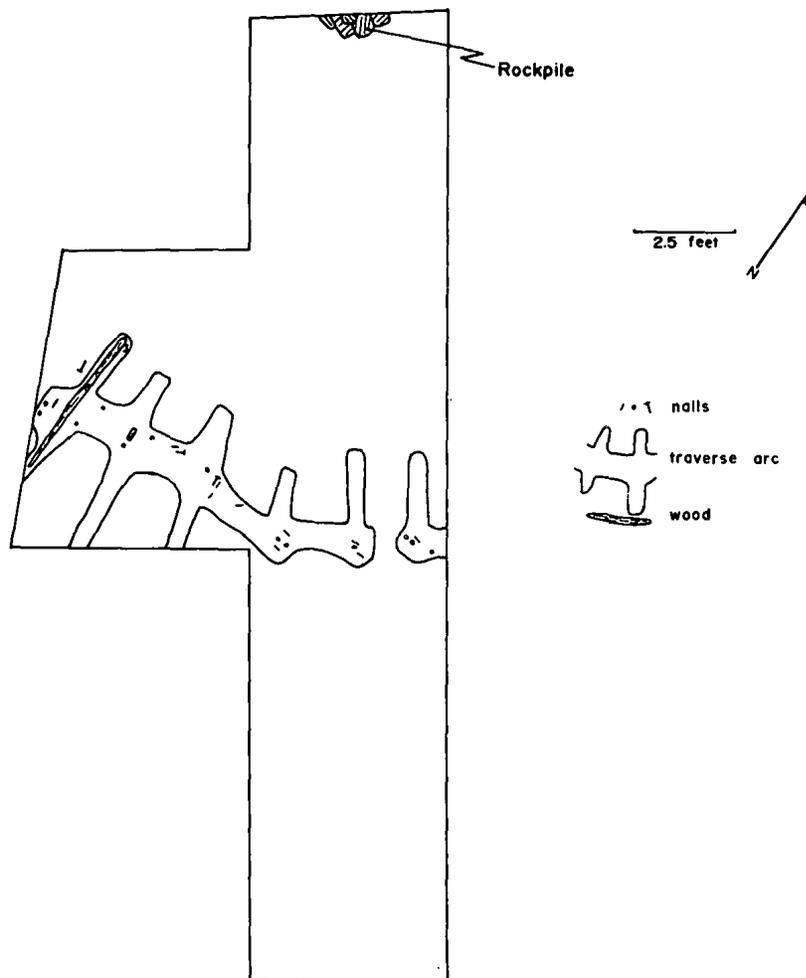


Figure 9.--Ground plan of excavations in Gun Position 4.

A traverse arc was uncovered about 13 feet behind the parapet. Its left end ran almost to the traverse. The right half was not excavated. Six sleepers were found, numbers 5 and 6 containing timber remains. The traverse planks were not well defined but could be discerned.

A pile of rocks near the parapet may have some connection with the front pintle, which should have been a little over a foot away, judging by the curve of the arc. The radius of the arc is about 11.5 feet.

Artifacts found include:

2 wooden sleeper fragments.

27 iron nails and spikes.

1 iron shell fragment.

3 green tinted glass bottle fragments (probably recent).

1 tin can (probably recent).

Gun Position 5

A 5-foot-wide trench was dug lengthwise through this position, and another trench was cut with a backhoe to the right of this. No floor was defined in this position. There were a number of nails at a depth of 8 inches, but they were not lying on hardpan. There was a poorly defined depression running across this position but no

sign of a traverse arc. The location of this position on the crest of the ridge and the near absence of erosion from the parapet and traverses suggest that it was not filled in like the others and that the "platform" was exposed longer, resulting in its destruction.

Artifacts consisted of 16 square iron nails scattered about the position.

Gun Position 6

An 8-foot-wide trench was dug across this position. The floor was exposed at a depth of 21 inches. Roots hampered excavation, and after the floor was exposed it was inundated by rain. Repeated pumping and flooding over a 9-day period eroded the floor of the pit so badly that it was abandoned. Four sleepers were noted in the daily log for May 7, but the ends of only two sleepers, and possibly a third, were located on May 16, when the section was drawn. The traverse arc to which these belong was located behind the pit about 16 feet from the parapet, and never uncovered. The remains are similar enough to others to indicate a front-pintle mounting for the gun.

Artifacts included:

39 iron nails and spikes.

1 3-inch grape shot.

1 sample of charcoal or black powder.

Gun Position 7 (figs. 10 and 11)

An 8-foot-wide trench was dug across this position. Like Gun Position 6, it was inundated for about 9 days. Fortunately, there were still about 6 inches of fill over the floor and damage was slight. The floor was 39 inches below the surface. This was the best preserved of all the traverse arcs excavated and it was possible to work out the entire pattern along with dimensions of each sleeper and traverse plank. Measurements (in inches) of the 11 sleepers and 6 planks, numbered from left to right, are as follows.

Sleepers				Planks			
No.	L.	W.	Th.	No.	L.	W.	Th.
1.	40	5	5	1.	54	9	2
2.	56	6	5	2.	45	12	2
3.	53	6	5	3.	45	12	2
4.	56	6	5	4.	45	12	2
5.	56	6	5	5.	45	12	2
6.	55	6	5	6.	39	9	2
7.	51	6	5				
8.	58	6	5				
9.	49	6	5				
10.	54	6	5				
11.	38	6	5				

In addition, there was a plank behind the right side of the traverse arc. Measuring 60 inches long, 12 inches wide and 2 inches thick,

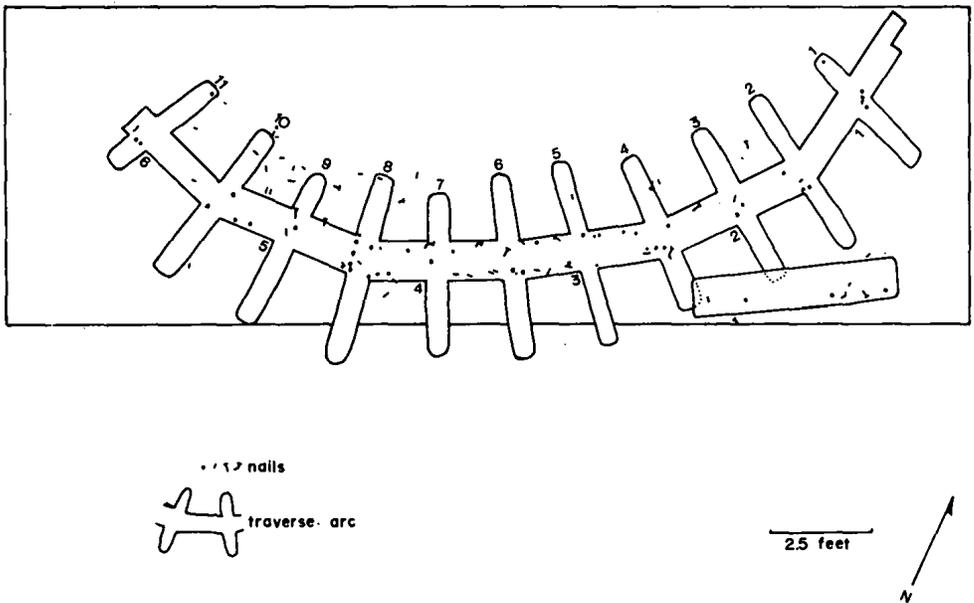


Figure 10.--Ground plan of excavations in Gun Position 7.



Figure 11.--View of the traverse arc in Gun Position 7.

the plank's function is unknown. It should be noted that planks cross odd-numbered sleepers and meet other planks on even-numbered sleepers. The plank between sleepers 6 and 8 was still visible, but poorly preserved. Measurements on sleepers were taken from gray clay outlines found in the bottom of the sleeper trenches. These trenches averaged 1 inch wider and 2 or 3 inches longer than the sleepers they contained. Thickness was measured from the floor of the trenches to the bottom of the traverse planks. The sleepers were square cut timbers. Traverse plank width was defined by the gray clay outlined in the red hardpan; thickness was measured from the heads of vertical nails driven through the planks into the hardpan; and plank length was measured from center to center of the even-numbered sleepers except in the case of end planks which were defined in the hardpan. The radius of the arc is 11.5 feet.

Artifacts found include:

- 1 traverse plank (fragmentary).
- 121 iron nails and spikes
- 5 iron strap fragments (four with nails in them).
- 1 half of an iron end plate from a stand of grape shot.
- 1 lead shell fragment.
- 1 flattened .69 cal. minie ball.
- 1 unidentified iron object (lever?).

1 dark amber glass bottle hand-blown in a mold
(neck missing).

4 friction primers.

1 iron wire (vent cleaner?).

1 short iron bolt.

Gun Position 8

One 5-foot-square pit was sunk in this position. The floor was a red clay hardpan at a depth of 31 inches from the surface. The end of a sleeper containing wood fragments was found in the southeast wall. This was taken as evidence of a front-pintle traverse arc and no further digging was done in this position.

Artifacts include:

2 wooden sleeper fragments.

2 fragments of an iron strap.

1 square iron nail.

1 .58 cal. minie ball.

Gun Position 9

One 5-by-10-foot pit and one 5-foot-square pit were dug in this position to a depth of 23 inches, where a red clay hardpan was encountered. Nothing was found on the floor in indicate a gun platform. Artifacts consist of two square iron nails and an iron shell fragment.

Gun Position 10 (fig. 12)

An irregular pit was excavated with a backhoe to a depth of 41 inches, where a red clay hardpan floor was exposed. Resting on this floor were three 10-inch solid iron cannonballs. These are apparently unexpended ammunition for the 10-inch Columbiad mounted in Gun Position 11. After hauling them to the gun, the Confederates did not have a chance to fire them and it is interesting to speculate why the Union troops did not remove them. They may have become buried during the battle, but the profile indicates silting and more than likely the Union troops did not want to have to carry them around. Nothing else was found in this position.

Gun Position 11 (figs. 13 and 14)

Before excavating this position we cleaned out the intrusive pit in the center. Nothing was found. Evidently the soldiers had dug down to hardpan and removed all traces of the iron bars or the wood they reported seeing. A pit, 18 by 13 feet, was opened to a depth of 31 inches by the backhoe, which also removed a cedar tree growing in the position. A substantial platform with large timbers was expected, but there was none. Planks about 2 inches thick were used as sleepers. These were erratically spaced around a center



Figure 12.--Three 10-inch Cannonballs found in Gun Position 10.

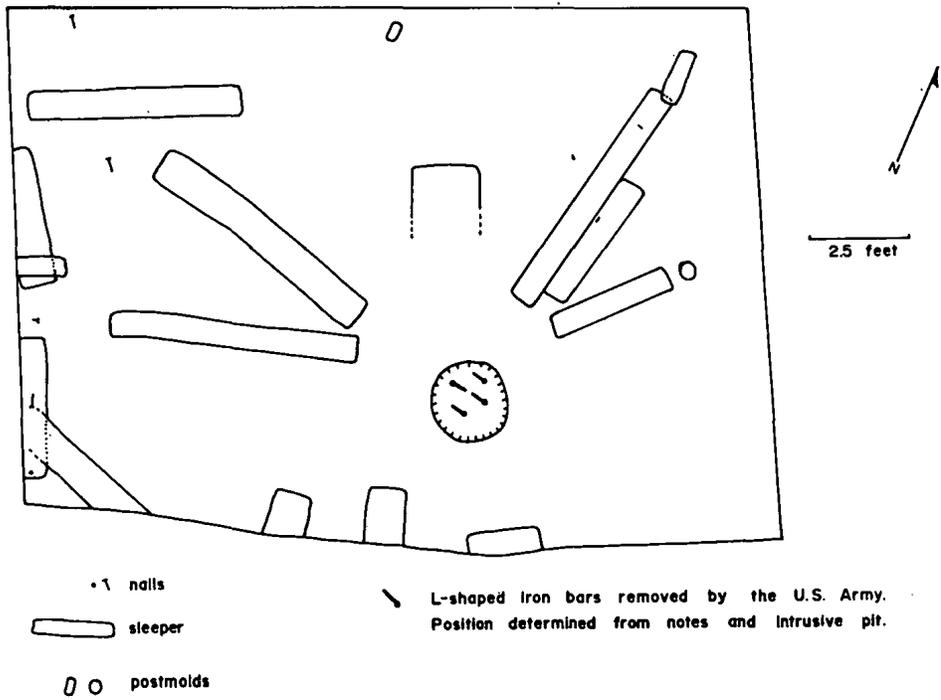


Figure 13.--Ground plan of excavations in Gun Position 11.



Figure 14.--View of the sleeper molds in Gun Position 11.

point, where the Army removed four L-shaped iron bars set vertically. Iron nails were practically nonexistent, and most of the few found were not associated with the traverse arc. No traverse planks were found. All of this, even if there was an iron traverse rail, indicates a flimsy, hastily constructed traverse arc and may explain why the Confederates had so much trouble with the gun (Bearss 1968: 21-22). One sleeper deserves special mention. It was located in the front part of the arc and appeared to be set at an angle. It may have been driven under the rail to counteract the depression that developed during the battle (Bearss 1968:21); or, more probably, it may have tilted and thus created the depression. Several plank molds and a log mold were found outside the traverse arc, particularly along the left traverse. These may have been associated with the revetting of the traverse. Two post molds may have functioned in similar fashion and suggest that this position was revetted with planks held in place by posts.

Artifacts found include:

- 13 square wrought iron nails.
- 56 brass friction primers (mostly packed and unfired).
- 1 lead shell fragment.
- 1 .58 cal. spherical lead ball.
- 1 .58 cal. minie ball.

1 iron end plate from a stand of grape shot.

1 thick iron strap, bent and cracked.

The friction primers were packed in lots of 10 or more and wrapped in newspaper, which was then protected with straw.

Other Excavations

Behind the southern half of the battery are several depressions in the hillside. One of these was explored and shown to be a 5-by-10-foot pit, 3 feet deep. It apparently functioned as a foxhole, probably for spotters who could adjust fire.

In an effort to prevent water from running into the pits during heavy rains, the Confederate drain was cleaned out above the southern half of the battery.

Upper Water Battery

Gun Positions

About two-thirds of the area behind the parapet was tested down to hardpan, at an average depth of 8 inches. Deeper trenches were dug with a backhoe to insure that we were down to the original surface. Eight square wrought iron nails were found in situ on the

hardpan. The remaining artifacts clearly belong to the use of the area as a picnic grounds. No evidence was found for any of the three gun positions supposed to be located within the Upper Battery. Their placement remains conjectural and will have to be reconstructed from historical evidence.

Upper Powder Magazine

This magazine is located west of the Upper Water Battery. It had not been previously explored. A trench 12 feet long and 5 feet wide was dug across a depression which indicated the collapsed tunnel into the magazine. The results were not entirely satisfactory. Most of the tunnel was apparently dug or set in fill dirt and its walls are not distinct. Judging from interrupted lenses in the fill, it was 2.5 to 3 feet wide, but of unknown height. In the bottom of the tunnel was a trench 18 inches wide. The position of nails in this trench indicate a sluice-like arrangement, possibly a wooden drain, 14 inches wide.

Artifacts found include 22 iron nails and 4 fragments of iron straps.

Alternate Gun Position 4

There are four gun positions on the ridge behind the Lower

Water Battery. Guns were mounted in these but moved to the Lower Battery before the battle. It was hoped that an excavation in one of these would give platform details without having to remove as much fill. The floor, an orange-brown clay hardpan, was exposed at a depth of 9 inches but the pattern of the traverse arc, while present, was indistinct. Outlines of five sleepers and the traverse planks were found, but their distorted appearance and the absence of nails suggest that the traverse arc was removed along with the gun and taken to the Lower Battery. The radius of the arc was about 11.5 feet. No artifacts were found.

RESTORATION GUIDELINES

Lower Water Battery

Because each gun position presents a unique situation, it will be necessary to describe each one separately. There are certain specifications common to all, however, and these will be discussed first.

The face of the parapet should form a nearly straight line for its entire length, with a slope of 40° except where it is now steeper. It should have a grass cover and be free of trees or stumps. The same would be true for the exterior of the flank traverses. The reverse slope of the parapet and the sides of the traverses, except the exterior flanks, should be revetted with reinforced concrete to a height of 4 feet. This should have a 90° interior slope and be concealed behind wooden hurdles and planks. The superior surface of the parapet should be about 9 feet thick and slope 8° away from the gun positions. The width of the traverses will be narrower, with no slope.

The measurements given below for the parapet and traverses do not include raising them an additional 2 feet with sandbags filled with tinted cement. These will match the 40° slope on the face of the parapet and flanks of the battery, and should be stacked

vertically on the traverses and interior of the parapet, leaving a 1 foot berm. The superior surface will slope 8° away from the gun positions. Embrasures 5 feet wide will be left in the center of the parapet, except where noted. The cheeks of the embrasures should have a 40° slope and the sole of the embrasure should slope 15° away from the positions. The cheeks of the embrasures and the exterior and top of the merlons should be lined with simulated rawhide. This may have to be developed commercially to meet the following specifications:

- (1) Must look like rawhide.
- (2) Must be waterproof.
- (3) Must be able to withstand temperatures ranging from -50° to 200° F.
- (4) Must be flexible.
- (5) Must have a life expectancy of 5 or more years.

Use of this product, if it can be procured, will permit the substitution of dirt for cement in sandbags on those portions of the embrasures and merlons it will cover. A modacrylic textile fiber product would probably do the job.

The floors of each gun position should be level with the gun platforms embedded in it. Since drainage is a problem, an 18-inch culvert should be laid beneath the communications trench, which runs behind the positions, and drains should be covered by grills

placed in the rear of each position to take water out of the battery. The culvert could empty into the lake, on the right, and beyond the left flank, on the left.

The hillside behind the battery should be left untouched except for filling in erosion channels, building up the face of the powder magazine, and removing fill from the depressions and dugouts behind Gun Positions 5 through 10. The area immediately to the left of the magazine behind Gun Position 5 should be built up to match the slope behind Gun Position 4, since it appears to have eroded away. The hillside should be sodded.

The original drain behind the battery should be kept clean and in working order. Riprapping and culverts may be necessary to do this.

All trees should be removed from in and around the battery, from the river to a distance of 20 feet beyond the left flank. All stumps within the battery must be removed, but others may be left standing to a height of 2 feet, with the tops rounded with axes. Felled trees should be left at the foot of the hill and, particularly, between the right flank of the battery and the river. This should be done as soon as possible to give stumps in the parapet a chance to decay before they have to be removed. This will minimize damage to the parapet during their removal. The

stumps will have to be removed to prevent slumping after the restoration.

Gun Position 1 (Fig. 15)

The floor of this position should be 28 inches below its present level. Considerably more fill will have to be excavated from the left half of the position, where the left traverse has washed into it.

Except for the addition of sandbags, the right traverse will be the proper height once the fill is removed from the floor. About 1 foot of dirt will have to be cleared from the parapet, from the center of the position to the left traverse, and then sandbags will have to be added to it. An embrasure 8 feet wide should be left in the right-center of the parapet.

A centre-pintle traverse rail for a 32-pounder should be laid in the center of the position. Sleepers should be laid like the spokes of a wheel, with narrow planks laid in an arc across these.

Gun Position 2 (fig. 16)

The floor level of this position needs to be lowered 28 inches below the present surface. Two feet of fill and sandbags

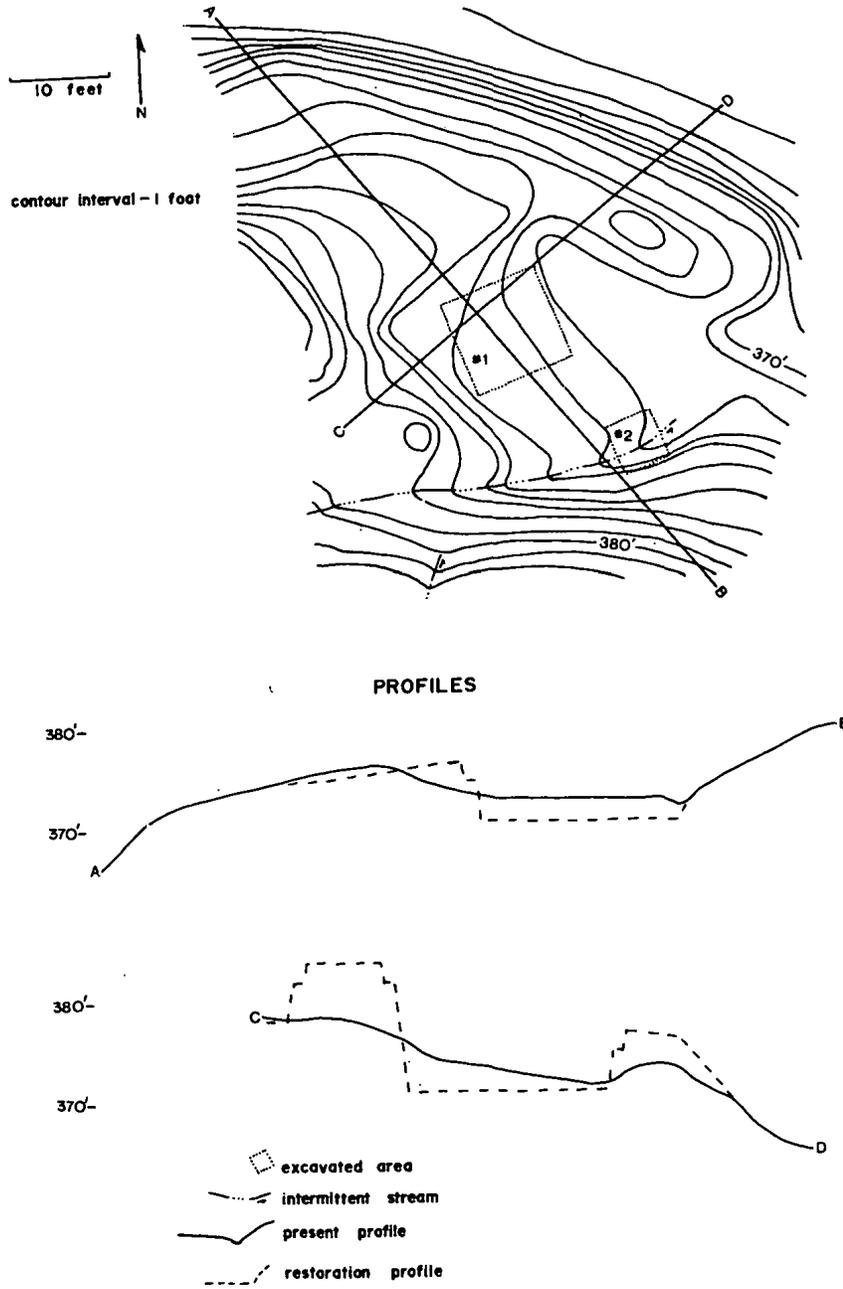


Figure 15.--Profiles of Gun Position 1.

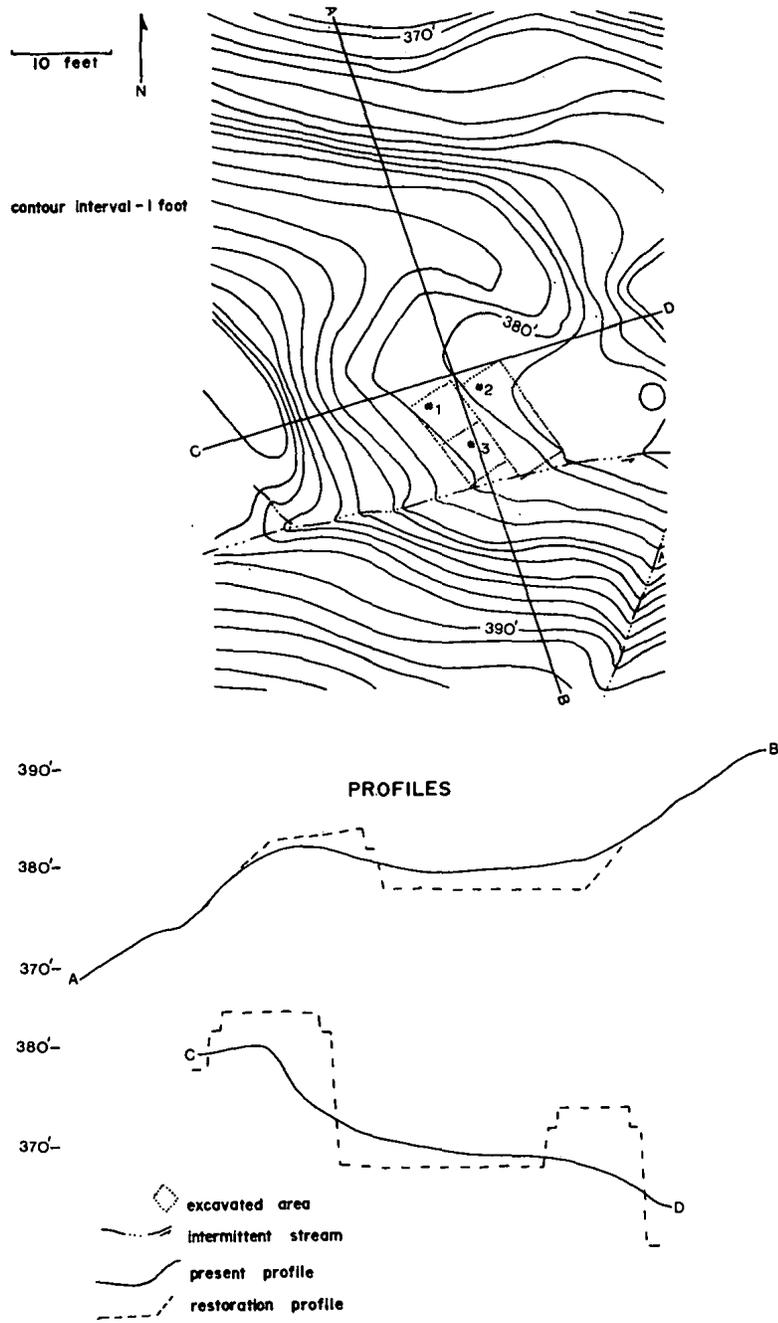


Figure 16.--Profiles of Gun Position 2.

need to be added to the right traverse. The parapet needs only sandbags and revetment.

A platform should be built on the floor of this position and a wooden traverse rail nailed to it. The platform need not cover the entire floor of the position and should be rough, with odd-sized boards.

Gun Position 3 (fig. 17)

Lowering the floor level 13 inches, raising the right traverse 2 feet, plus sandbags, and sandbagging the parapet, are all that need to be done to the contour of this position.

An arc of sleepers should be placed 12 feet behind the parapet and a wooden traverse rail with a radius of 11.5 feet should be nailed to these. This would locate the front pintle of the gun .5 foot behind the parapet.

Gun Position 4 (fig. 18)

The floor should be lowered 22 inches and the right traverse raised 1 foot. The center of the parapet has washed out and will have to be raised 3 feet.

A traverse arc mounted on sleepers should be placed 13 feet behind the parapet, with the front pintle mounted 1.5 feet back of the parapet.

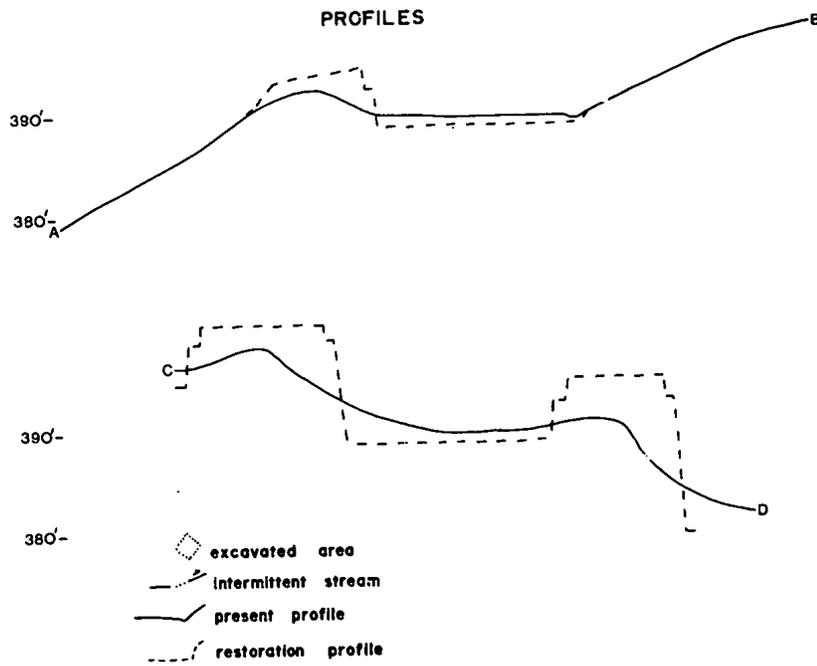
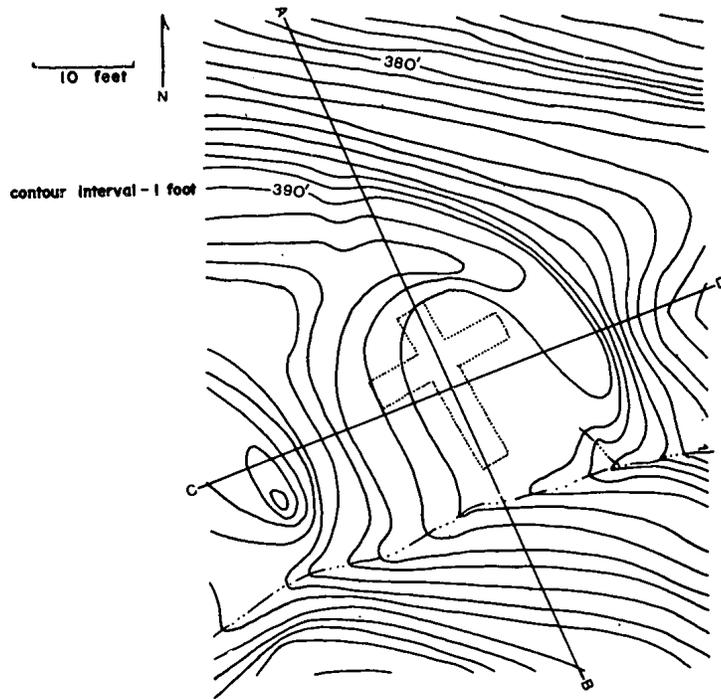


Figure 17.--Profiles of Gun Position 3.

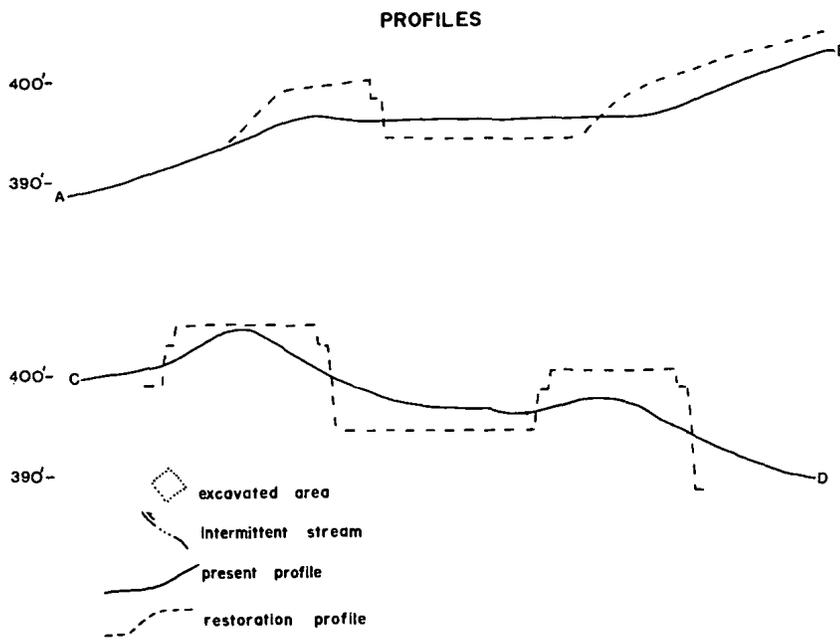
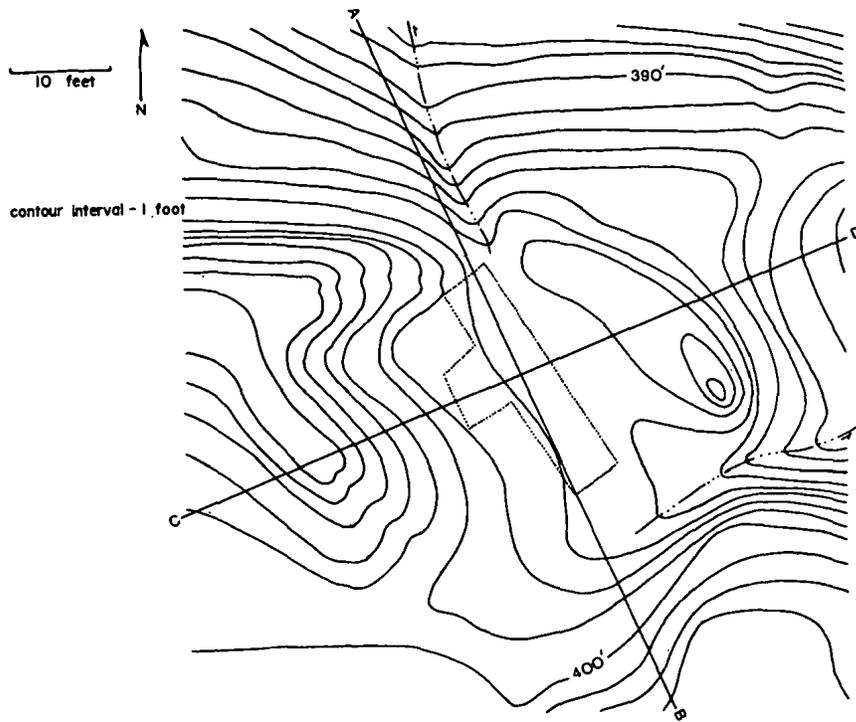


Figure 18.--Profiles of Gun Position 4.

Gun Position 5 (fig. 19)

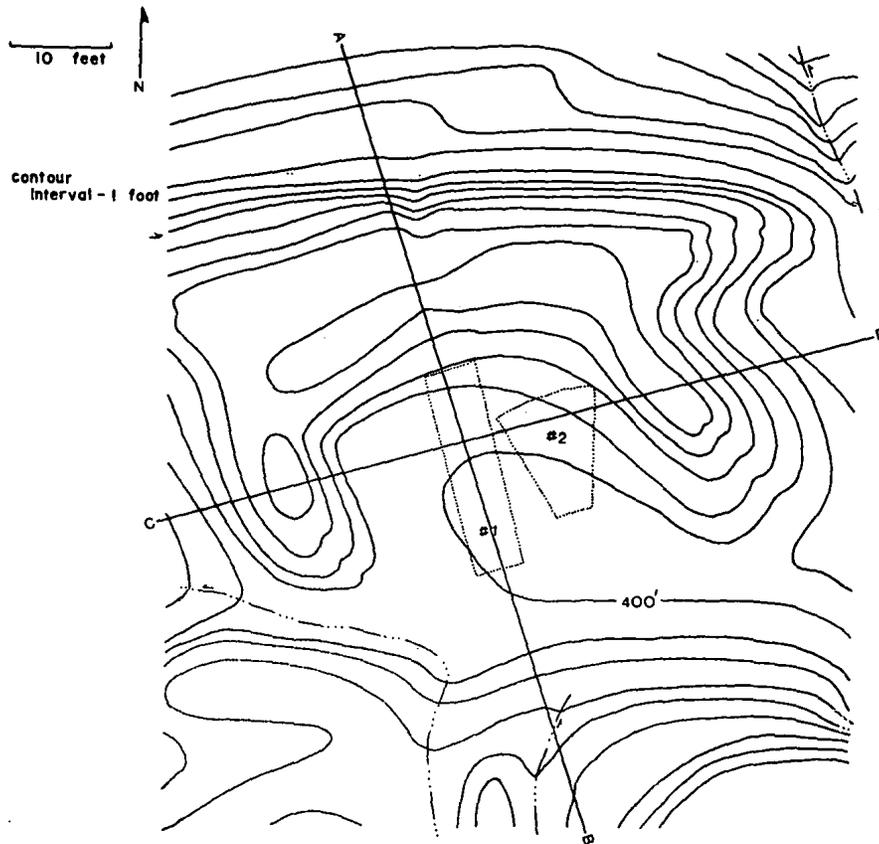
This is the only position which will have to have dirt added to the floor to level it. This should be done in the rear portion of the position. The parapet and traverses are the correct height and will need only revetment and sandbagging.

No gun platform was found in this position, and its presence and form are conjectural. The author feels that there was one and that it was the same as those in Gun Positions 3 to 8; that is, a front-pintle mount with a wooden traverse rail. The traverse rails in Gun Positions 6 to 8 were 16 feet behind the parapet, while those in Positions 3 and 4 were closer. Since the guns were mounted in batteries of four, the traverse rail in Gun Position 5 was probably the same distance back as those in Positions 6 to 8; 16 feet.

Gun Position 6 (fig. 20)

Floor level should be 21 inches below the present surface. One foot will have to be taken off the left traverse and the center of the parapet will need to be built up 3 feet where it has washed out.

The traverse arc, about 16 feet behind the parapet, was probably a wooden rail laid on an arc of sleepers.



PROFILES

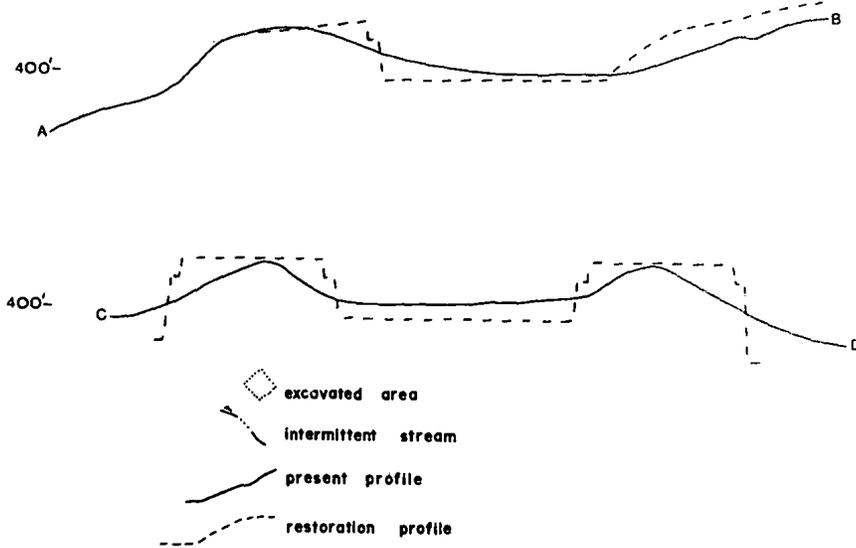
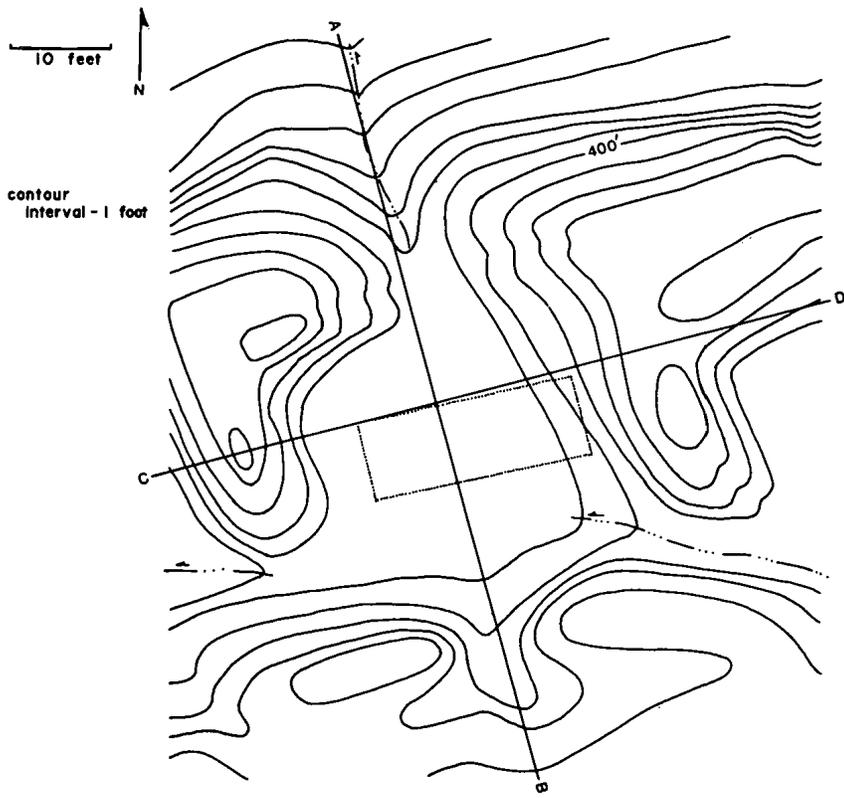


Figure 19.--Profiles of Gun Position 5.



PROFILES

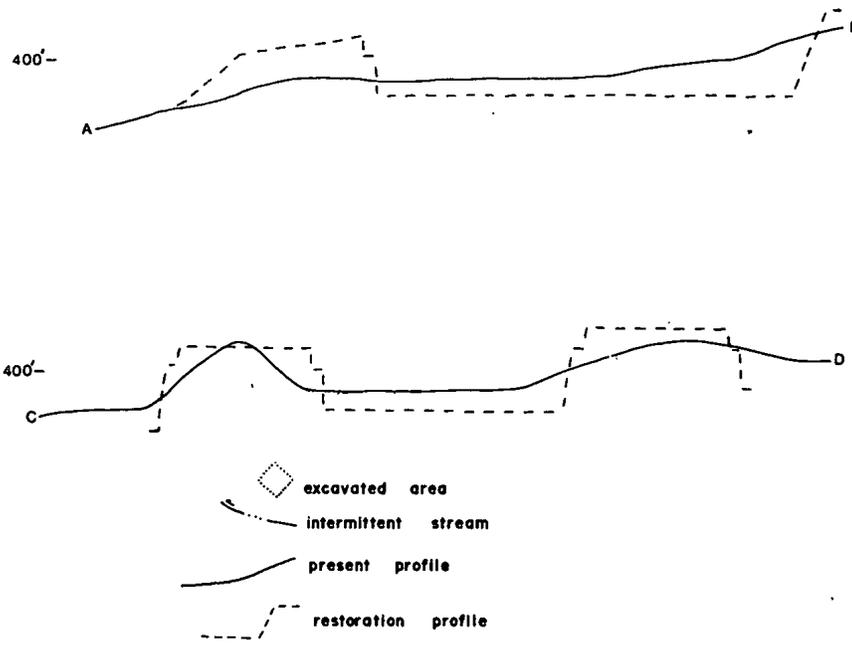


Figure 20.--Profiles of Gun Position 6.

Gun Position 7 (fig. 21)

It will be necessary to remove 39 inches of fill from the floor of this position and to build up the end of the left traverse, which has eroded badly. Otherwise, only sandbagging is needed.

This was the only traverse arc that was completely cleaned off. It lay 16 feet behind the parapet and had a radius of 11.5 feet. The ends of the traverse rail almost touched the traverses.

Gun Position 8 (fig. 22)

To restore this position, 31 inches will have to be removed from the surface and 1.5 feet added to the center of the parapet, along with some dirt to the end of the left traverse.

The traverse rail should be placed about 16 feet behind the parapet.

Gun Position 9 (fig. 23)

Removal of 23 inches of fill will be about all that is necessary to restore this position, except for sandbagging. No evidence of a platform was found in it and the author doubts that one was present.

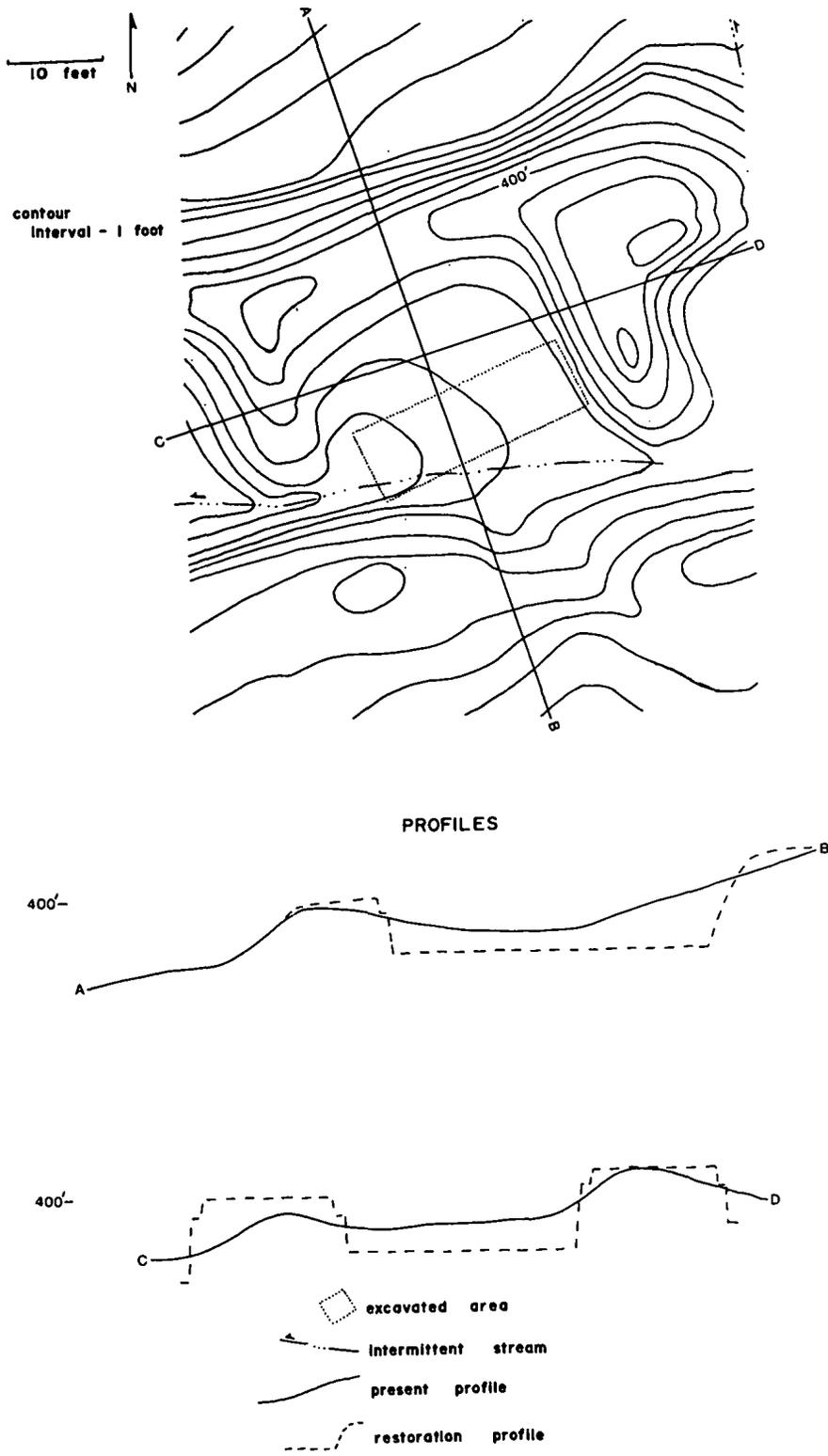


Figure 21.--Profiles of Gun Position 7.

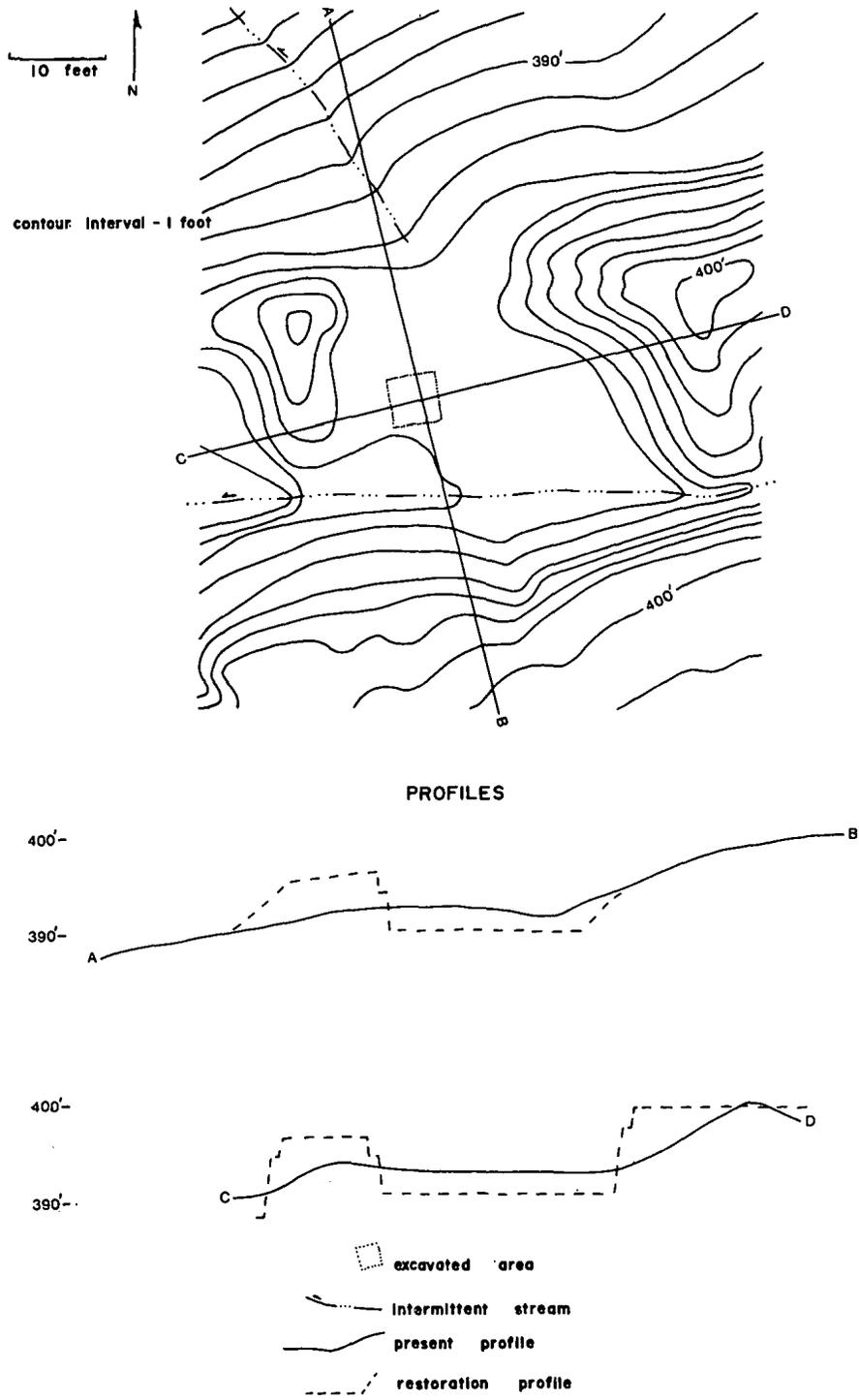


Figure 22. Profiles of Gun Position 8.

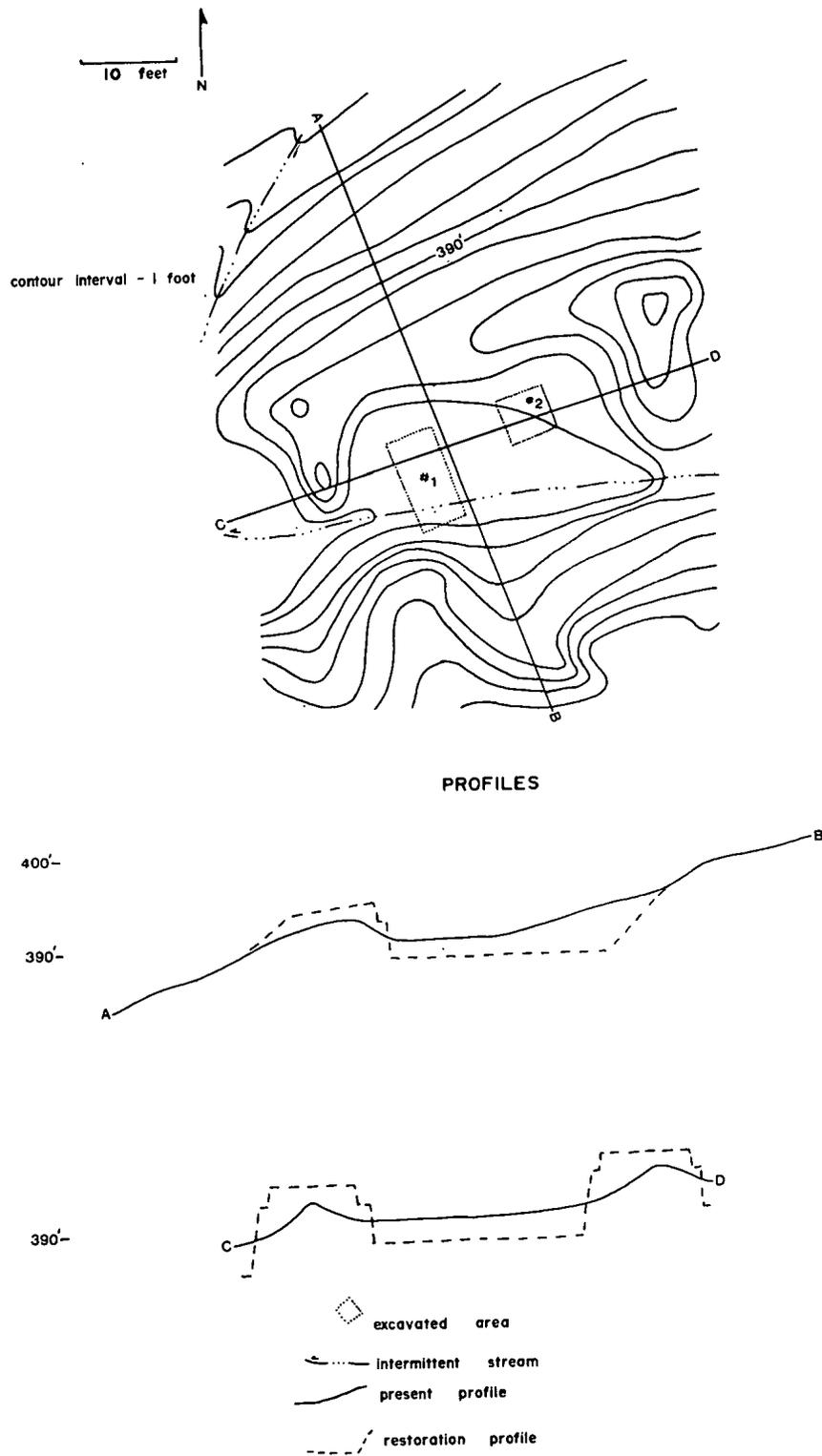


Figure 23.--Profiles of Gun Position 9.

Gun Position 10 (fig. 24)

The floor of this position should be 41 inches below the present surface. Some dirt will have to be added to the parapet to fill in ditches cut through it, but its height will not have to be increased except with sandbags. No gun platform was found in the position and the presence of the three 10-inch cannonballs indicates that it was used for ammunition storage for Gun Position 11.

Gun Position 11 (fig. 25)

This position should have a floor level 31 inches below the present surface. The parapet needs to be filled in on the right side where there is a gully through it. A wider embrasure should be left in this position, perhaps as much as 10 feet.

As indicated earlier, the "platform" was a flimsy structure and some form of hidden support may be needed to carry the weight of the gun.

Upper Water Battery (fig. 26)

Although the archeological investigation of this area produced no new information, there is enough historical documentation to make a reasonably accurate restoration of this battery. The

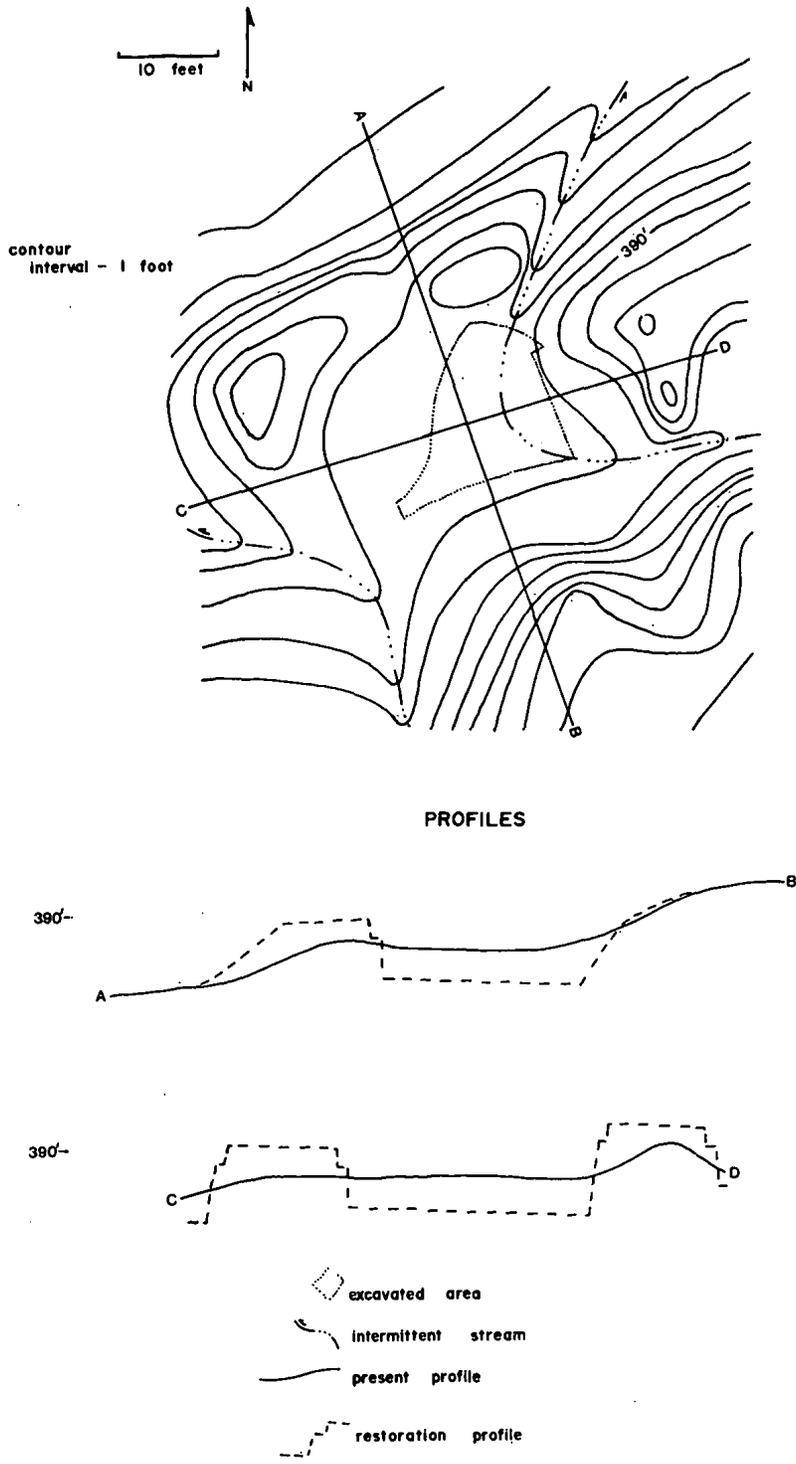
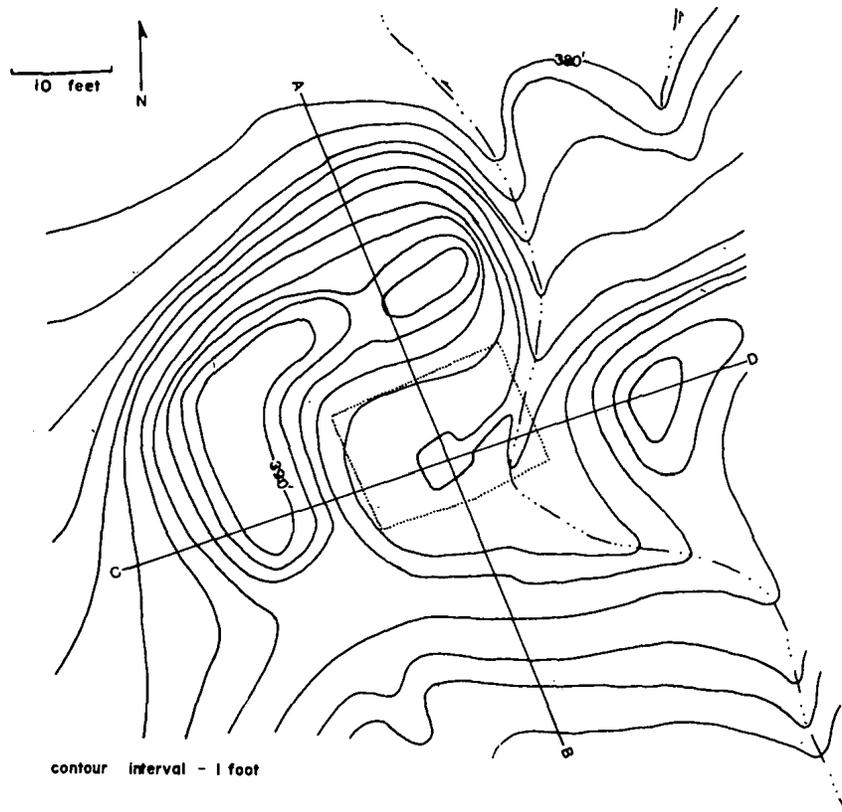


Figure 24.--Profiles of Gun Position 10.



PROFILES

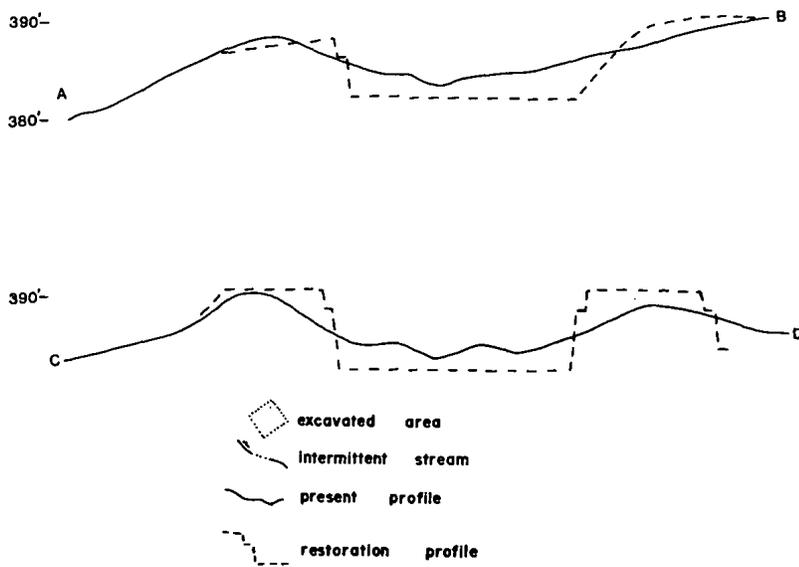
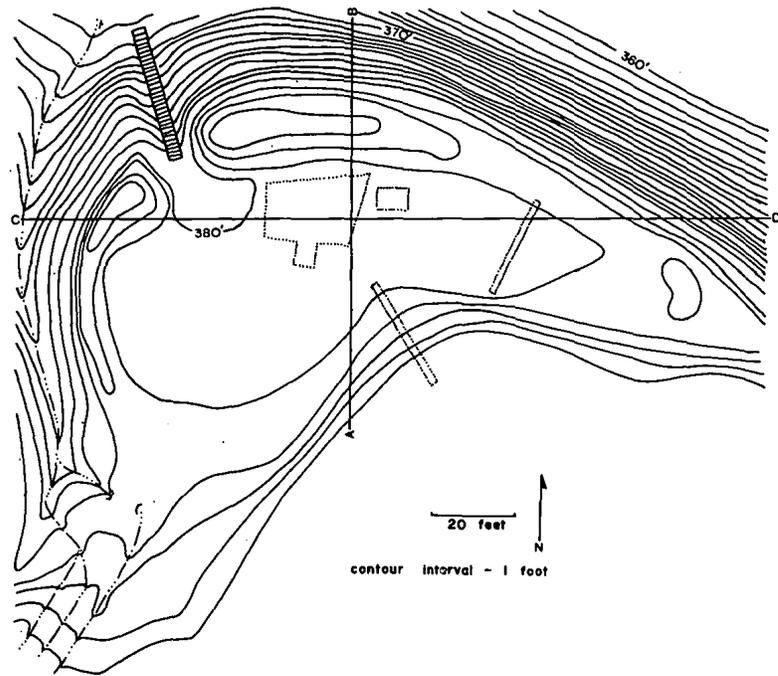


Figure 25.--Profiles of Gun Position 11.



PROFILES

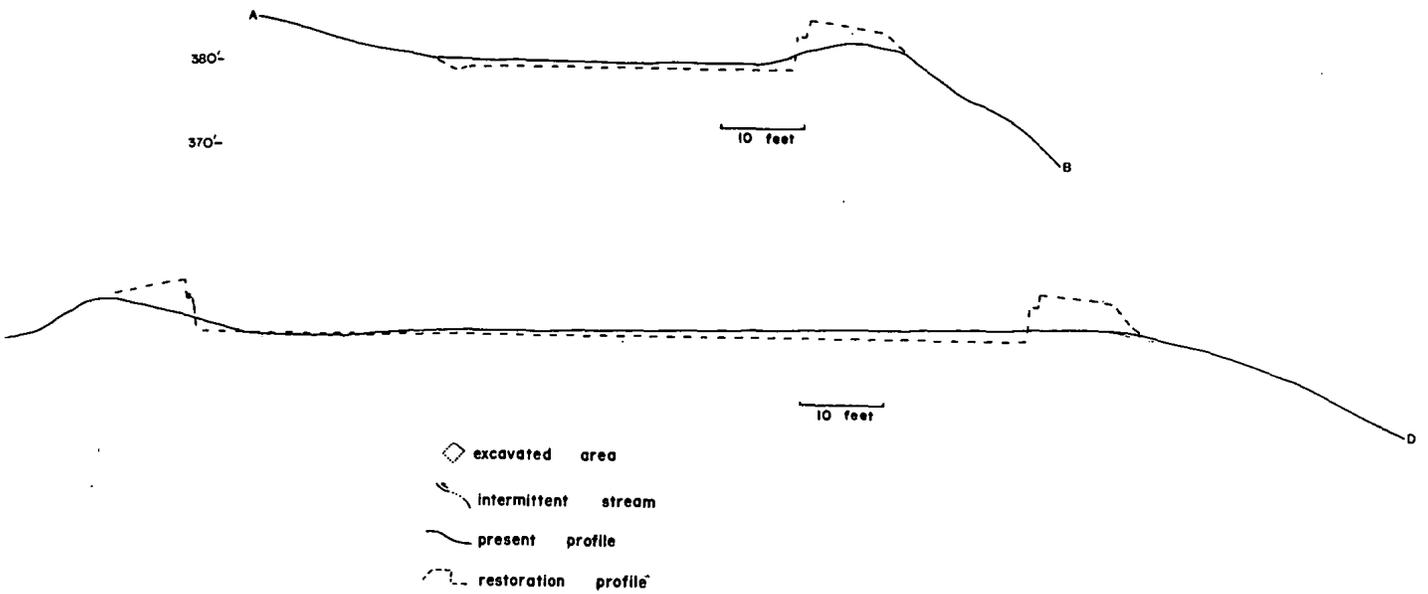


Figure 26.--Profiles of the Upper Water Battery.

area between the parapet and the hillside behind it should be level and at the elevation of the present surface. The parapet should be 16.7 feet wide at the base in the center, narrowing to 12 feet wide on the flanks. It should be 9 feet wide on top in the center and 8 feet wide on top at the flanks. It should be flat on top, with an exterior slope of 8° , and rise 4 feet above the interior level.

The interior slope should be revetted with reinforced concrete having a 96° slope and concealed behind rough-hewn planks held in place by posts driven into the ground at intervals of 3 to 6 feet. All wooden members should be treated with preservatives. The exterior of the parapet should have a slope of 40° and should be sodded.

On top of the parapet there should be four merlons of tinted cement-filled burlap bags simulating sandbags, forming three embrasures 2 feet high. The interior of the merlons should be vertical and recessed 1 foot from the interior slope of the parapet, forming a berm. The exterior should form a continuation of the slope of the parapet. The cheeks of the embrasures and the flanks of the merlons should have a 40° slope. The number of courses of bags will depend on the size of the bags used. The embrasures should be 5 feet across at the bottom and the sole of the embrasures should slope 15° away from the gun positions.

A 6.5-inch, rifled Columbiad should be mounted on a centre-pintle chassis in the center of the battery, flanked by two 32-pounder seacoast howitzers mounted on front-pintle chasses. For construction details, see the section on the Lower Water Battery.

The parapet should be prepared and given plenty of time to settle before the "sandbags" are placed on it. The battery should not be restored before the guns are ready to be placed on it. Otherwise, without the attraction of the guns, the parapet will be the focus of attention and suffer from adverse use, such as children climbing on and rolling off it. The same material used to line the embrasures in the Lower Water Battery should be used here also.

Trees in and around the battery will have to be removed when the battery is restored to its historic condition. The sooner this is done, the better. Those along the parapet wall will have to be obliterated; all others should be cut off 1 to 2 feet above the ground. The tops of these stumps should be rounded with axes after the trees are felled since the Confederates were scandalously short of chain saws. With the proper precautions, these will not be a safety hazard.

Because of the level ground, the height of the parapet, and the drainage of the hill behind the battery, drains will have to be placed in the battery. These will have to be installed before

restoration begins. It is suggested that one drain be installed at the foot of the hill behind the battery to catch the runoff from the hill, and that three smaller drains be placed at the three gun positions to catch the runoff from the trail. These could be run under the left flank of the parapet wall to the ravine. If people can be kept off it, the parapet wall itself should pose no drainage problem.

Restoration of the parapet will necessitate moving the culvert and present trail about 10 feet east of their present location. The drainage channel leading to this culvert should be deepened and lined with stone. Because of the gradient, erosion problems are not as great here as in the Lower Water Battery. Nevertheless, the problem is reaching a critical state. This could be alleviated with a little preventive maintenance, such as cleaning drains and filling gullies.

Upper Powder Magazine (fig. 27)

The author cannot see any reason why the Upper Powder Magazine should be restored to its original state. There is already one restored magazine and, while the upper one is probably not identical, it would not add much to the story. Instead, we recommend placing a false door in the hillside and filling in the depression

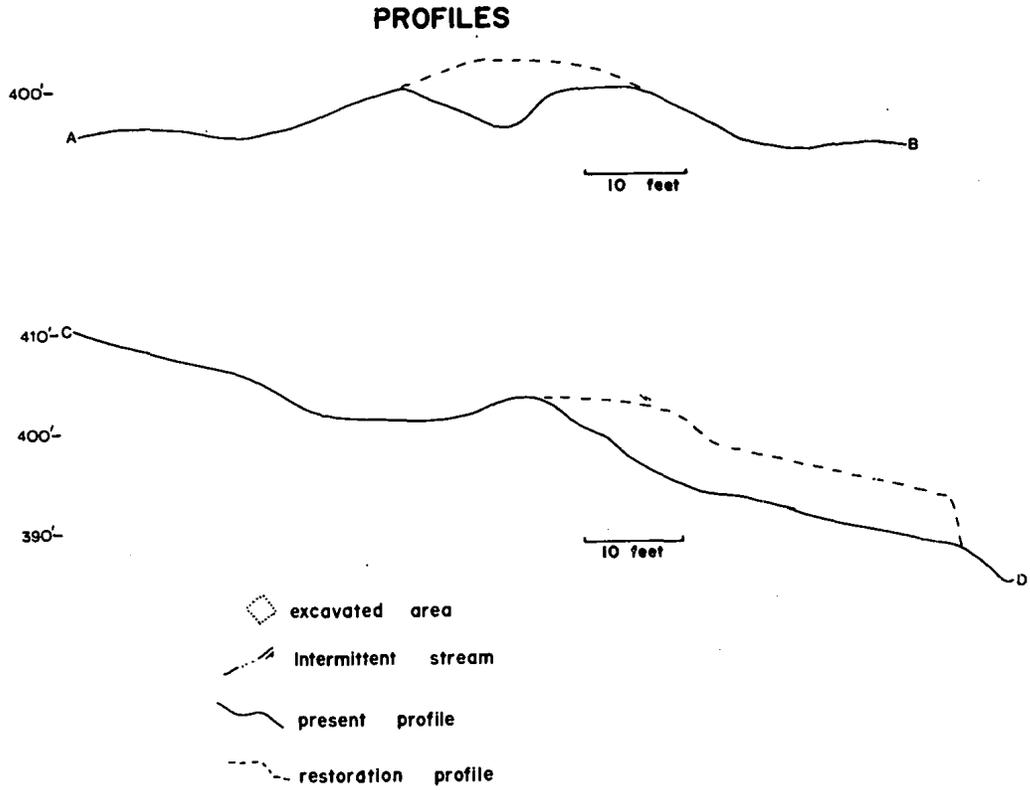
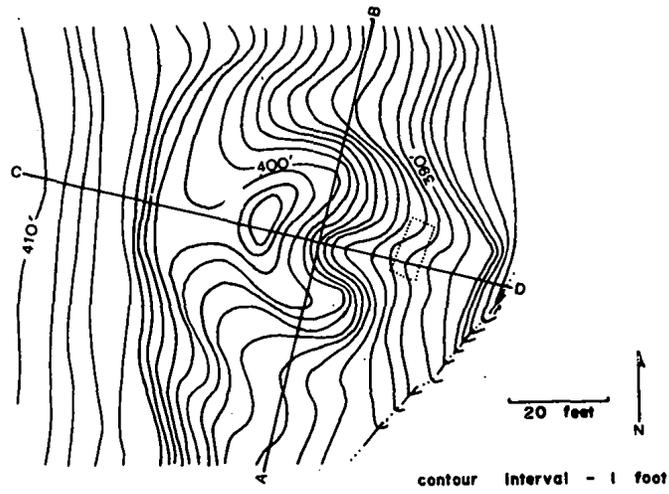


Figure 27.--Profiles of the Upper Powder Magazine.

along the tunnel and the center of the magazine to approximate its original contours. If a decision is made to restore it, further excavation will have to be undertaken since time did not permit study of it under this project.

Alternate Gun Positions

These are in a fairly good state of preservation except at the north end of Alternate Gun Position 1 which has been partly destroyed in the construction of the parking area. If the parking area is taken out, this position should be restored to look like the other three. Otherwise, no restoration is recommended.

INTERPRETATION

This section is not concerned with the story to be told at the Water Batteries or even its method of presentation. The purpose here is to lay plans for incorporating an interpretive program into the restoration by pointing up the features which can aid in the interpretation.

Lower Water Battery

Whether the parking area is removed or not, access to the battery will still be from a point at the rear of the center of the battery. At present, the trail runs down the hill into Gun Position 5, but if this area is built up to its original height it will be necessary to put in steps to get into the battery. It is suggested, instead, that the drainage ditch be lined with stone and used as a trail to Gun Positions 1 or 11, whence people can move the length of the battery. Because of the steep hill, it is suggested that Gun Position 1 would be the best place to start. Steps will have to be built into the drain and the communications trench to facilitate traffic flow (the latter will have to be built in any event). Some things which might be interpreted within the battery are the two types of guns and four types of "platforms"

used, the death of Captain Dixon in Gun Position 6, the construction methods of the battery, the ammunition used, and the conditions under which the battle was fought. A mowed trail could lead out to the mouth of Hickman Creek for a view of the battery as the Union gunboats saw it.

Upper Water Battery

The best point from which to view this battery is at the top of the hill behind it. When the Corps of Engineers buildings are cleared out, there will be ample room for parking and an overlook, all out of sight of the battery below. If an overlook is established here, trails will have to be constructed down to the battery and some means devised to keep people from taking shortcuts down the hillside. Two natural routes are open for a trail, and it is suggested that both of them be utilized to provide a smooth traffic flow. One leads down the hill to the left, to join the present trail entering the left flank of the battery. It is steep and will require steps and a railing. The other is less desirable because it creates an intrusion. It comes off the right side of the hill next to the river and enters the right flank of the battery. It, too, will require steps and a railing. The present trail should be retained. With both new trails, a problem will be created by the

exposed flanks of the parapet, which offer easy access to the top. The left flank can be protected by making it vertical and/or placing an interpretive sign in front of it in order to make climbing difficult. The present sign in the battery would serve admirably. The right flank is a greater problem but, since a railing is needed here anyway, it could be extended down into the battery and laced with chicken wire to keep people from climbing through. There are two reasons for keeping visitors off the parapets: (1) safety--the parapet will be up to 6 feet high and, thus, would be dangerous for small children; and (2) maintenance--the top and exterior slope of the parapet are subject to erosion and walking on them would increase the problems and cost of maintaining them.

SUMMARY

In the course of excavation, parts of eight gun "platforms" were uncovered. Only one of these had the appearance of a true platform, the remainder being simple wooden traverse rails nailed to wooden sleepers set in hardpan. It is evident that the Confederates were using makeshift materials and working in great haste. Some of the timbers had enough extraneous nails in them to suggest that they were re-used.

These excavations, along with the written records, provide enough information to make a reasonably accurate restoration of the batteries. The only point of conjecture will be the use of various types of revetment for the parapet and traverses of the Lower Water Battery.

Various specific recommendations in regard to restoration materials and procedures have been made, bearing in mind the nature of the terrain and the problems of maintenance that are sure to arise. If there are better ways to achieve the same ends, naturally they should be adopted instead.

There seems to be little likelihood that full restoration will be undertaken here before F.Y. 1970. In the meantime, steps should be taken by the park staff to maintain the batteries in

their present condition, to reduce the forces of erosion nibbling away at the batteries, and to take certain actions, such as the removal of trees, to achieve the original setting.

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APPENDIX 1

Artifacts found during the excavation

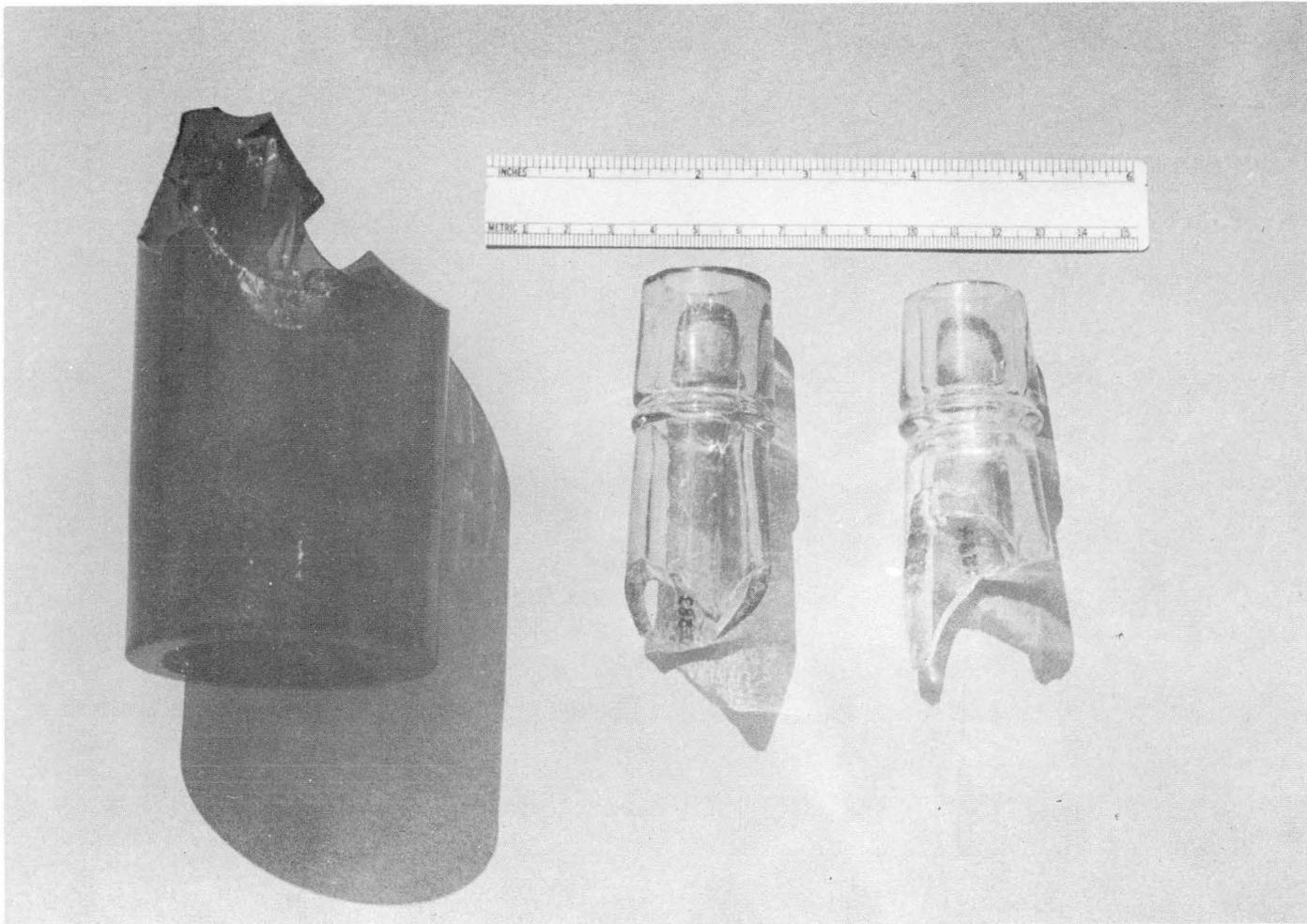


Figure 28.--Glass bottle fragments. L. to R.: Dark amber bottle blown in a mold with a kickup and 2 clear bottle necks.

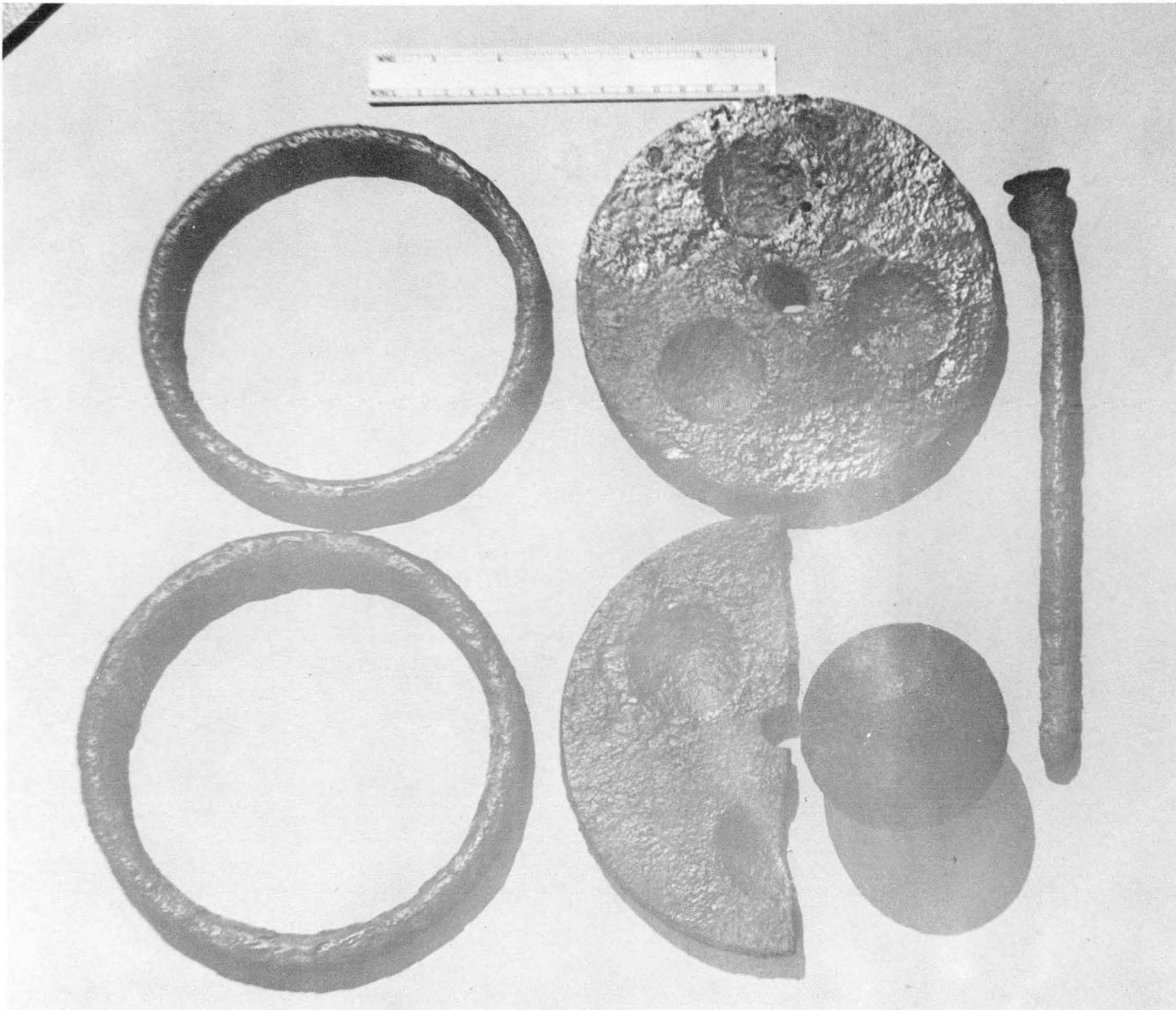


Figure 29.--Parts from stands of grape shot. L. to R.: 2 center rings, 2 end plates, 1 grape shot, and 1 center pin.

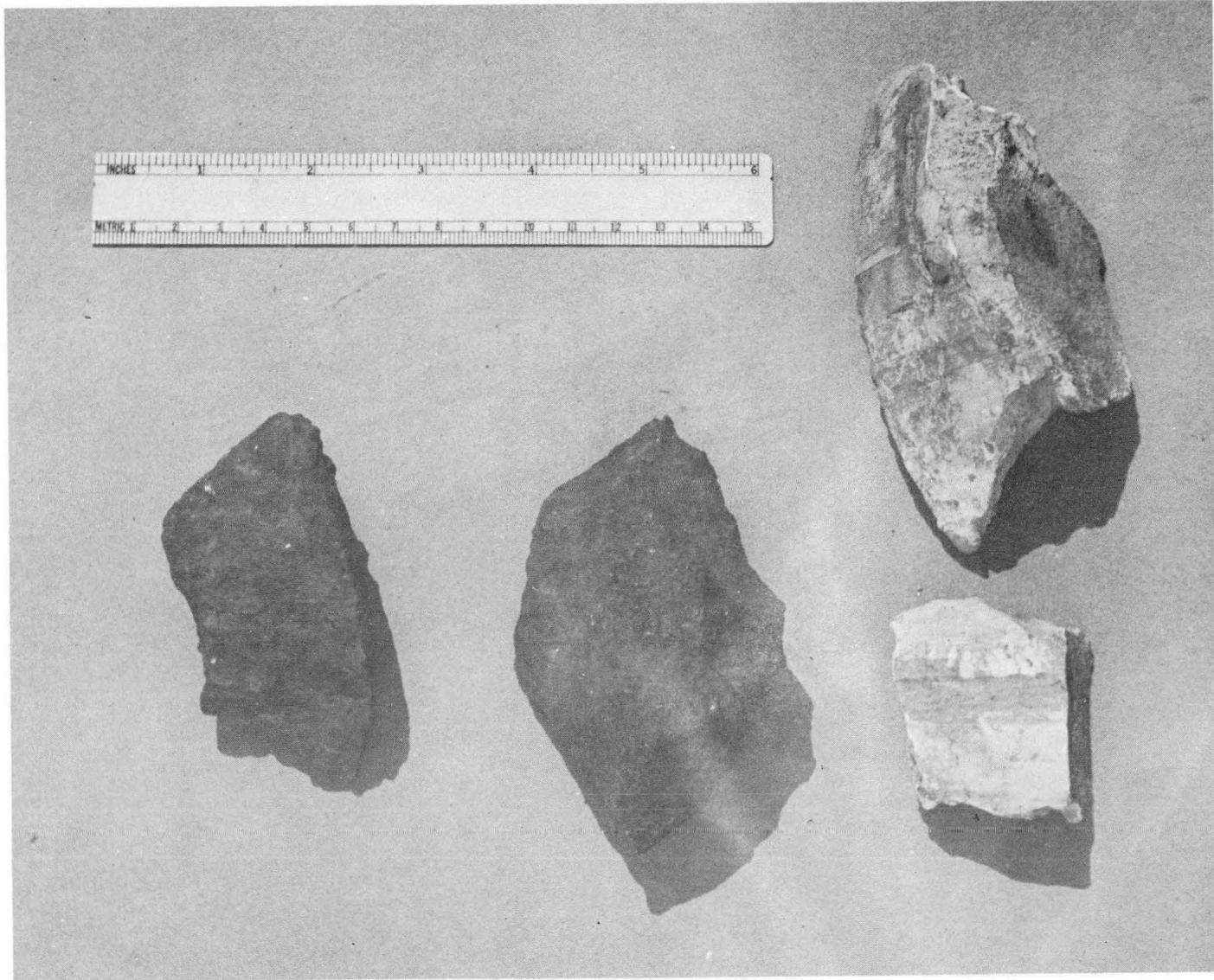


Figure 30.--Shell fragments. L. to R.: 2 iron shell fragments and 2 lead expansion ring fragments.

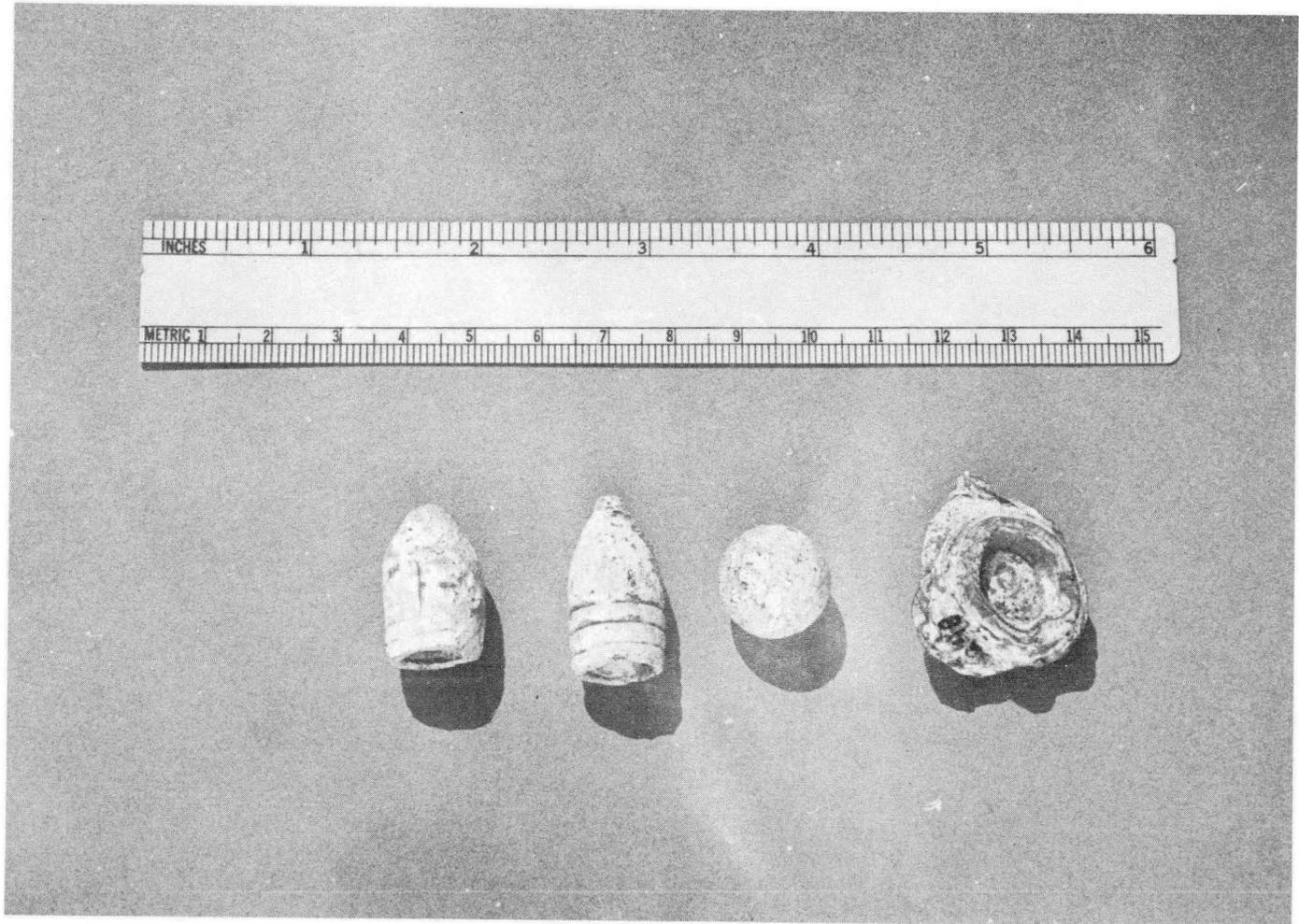


Figure 31.--Musket balls. L. to R.: 2 .58 cal. minie balls, 1 .58 cal. musket ball, and 1 flattened .69 cal minie ball.

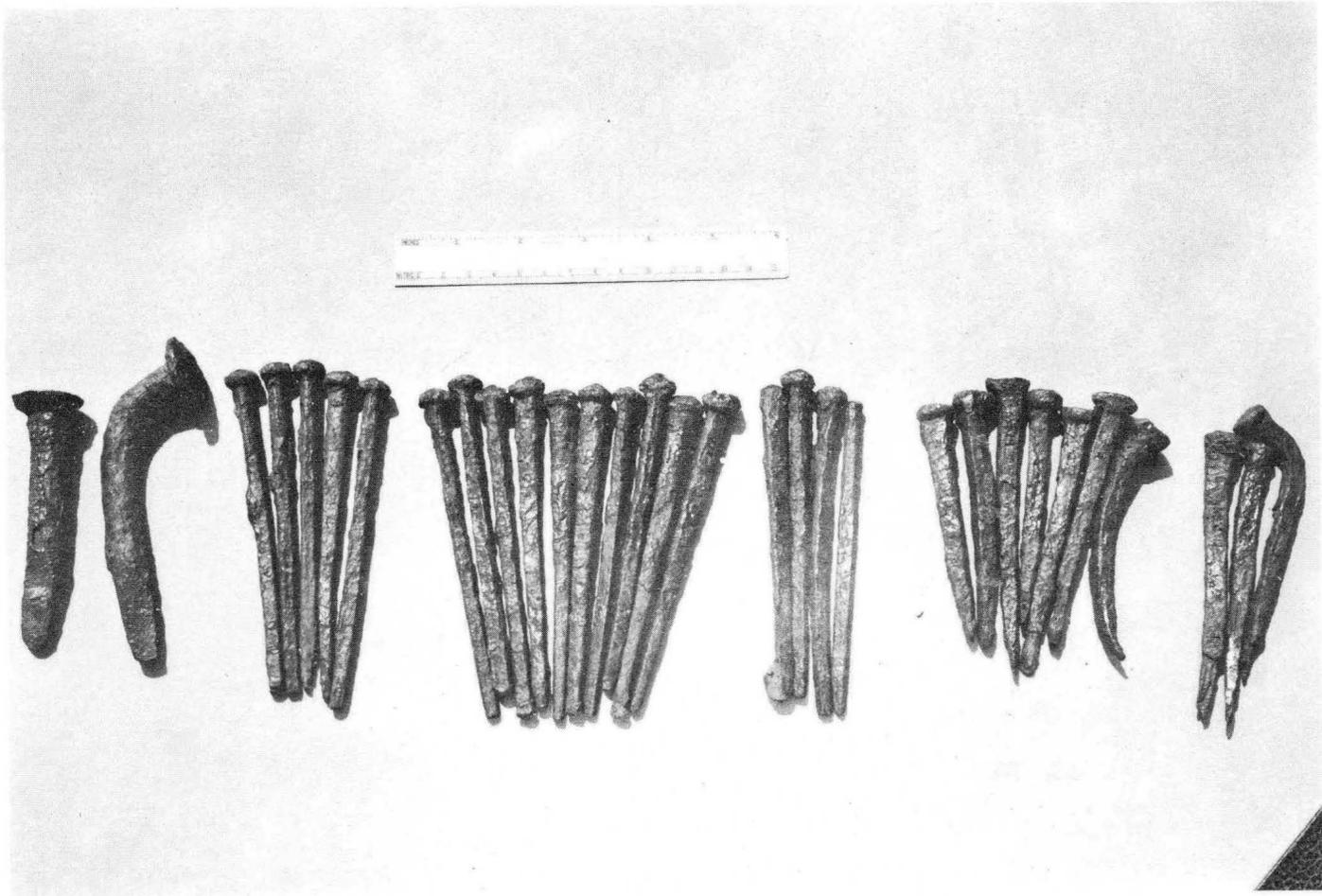


Figure 32.--Wrought iron spikes from traverse rails.

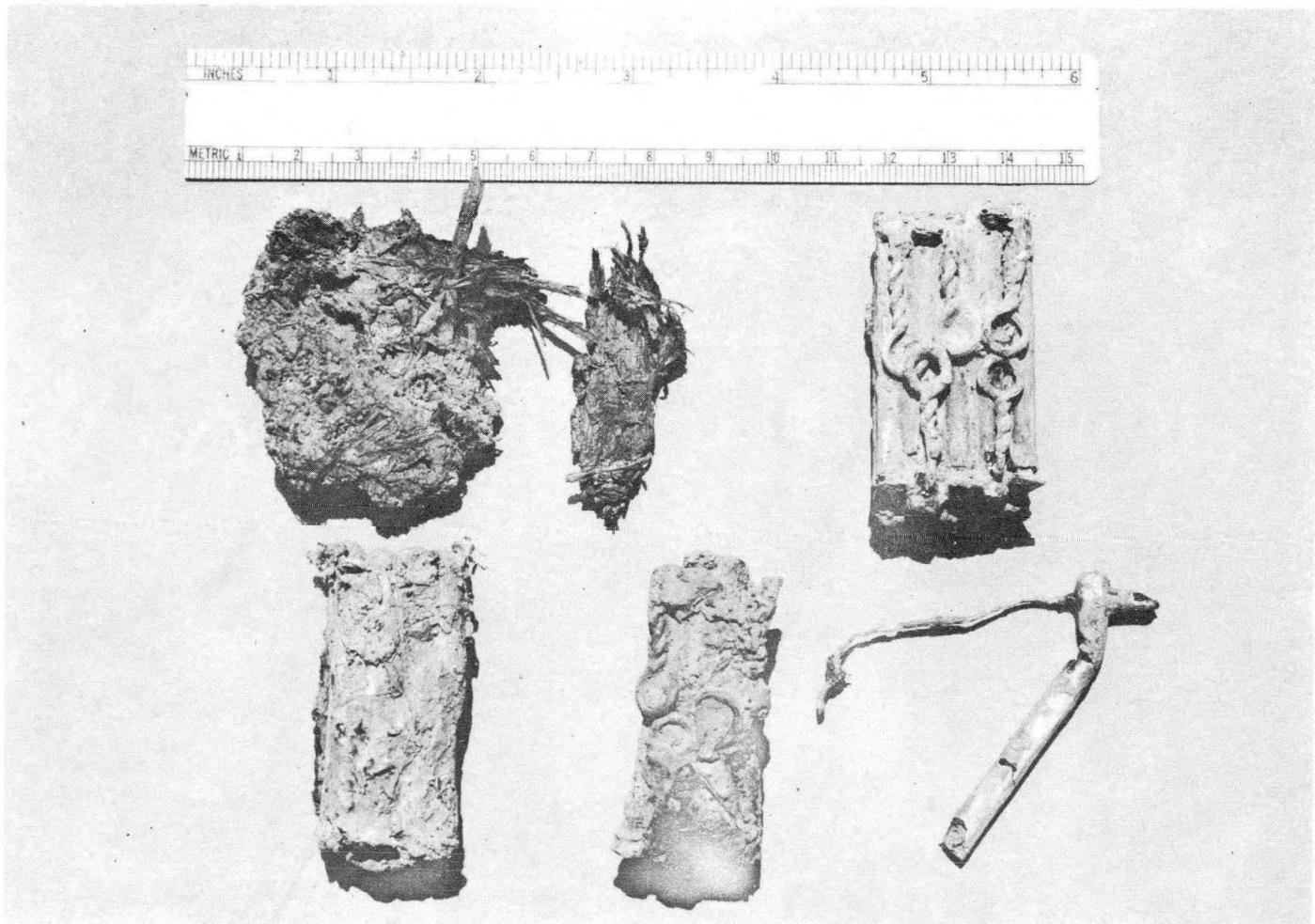


Figure 33.--Brass friction primers for cannon. Top left: straw found packed around primers; bottom left: primers wrapped in newspaper; top right: cleaned package of primers; bottom right: primer which malfunctioned when the pull ring straightened out instead of pulling out.

APPENDIX 2

Glossary of Military Terms

- Barbette -- A carriage or platform design elevating the gun to fire over the parapet.
- Battery -- A number of guns placed regularly for combined action; also a platform where guns are placed within the fortification.
- Casemate -- A carriage or platform design lowering the gun to fire through a gunport, loophole, or embrasure.
- Embrasure -- An opening in the parapet through which fire may be directed; a gunport.
- Epaulment -- See Parapet.
- Facine -- A bundle of branches tied together for strength and used to strengthen a position as a substitute for sandbags or other revetting material.
- Hurdle -- A woven fence used for revetting.
- Merlon -- That portion of a parapet between embrasures.
- Parapet -- Defensive works of stone or earth piled up to protect and conceal troops and guns.
- Revetment -- Any material, facines, hurdles, etc., used to hold dirt in place; a retaining wall.
- Traverse -- That portion of the parapet which protects the flanks of a position.