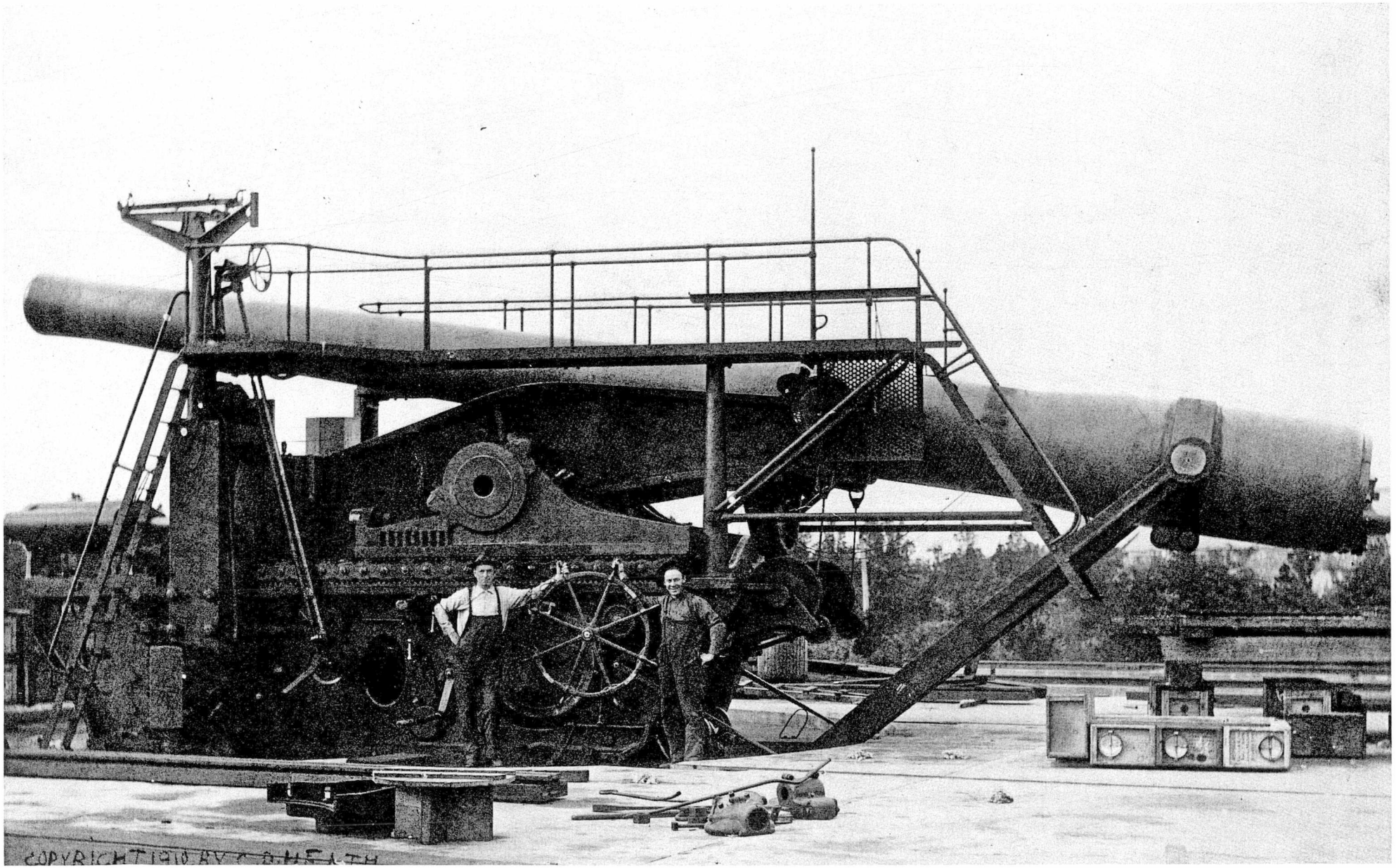
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Defending the Narrows
The Harbor Defenses of Southern New York

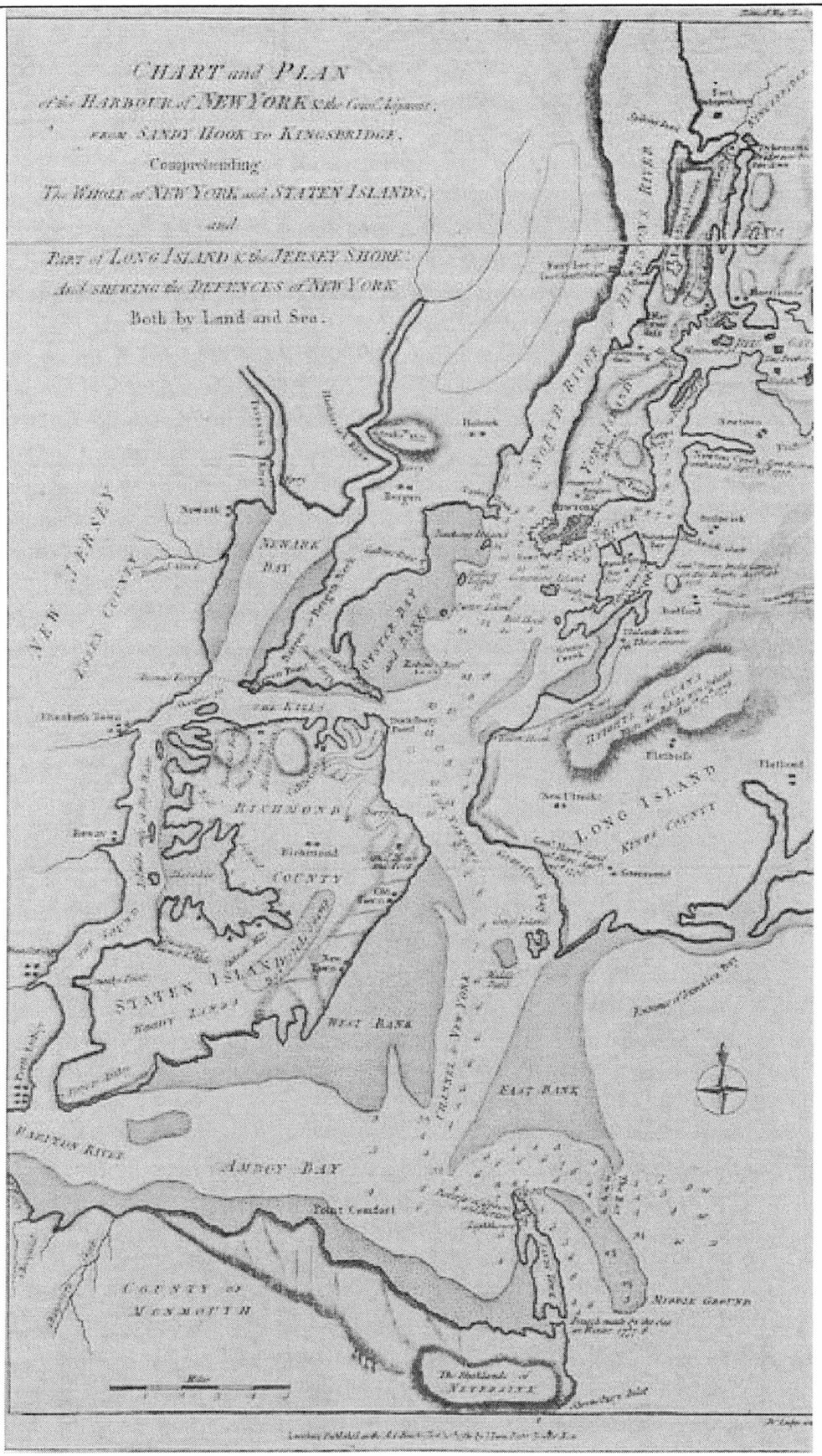
William C. Gaines

Part I: The Muzzleloading Era, 1524-1890

New York has been the nation's commercial center for 300 years, and the waters of Lower New York Bay and the landmasses that bound it were vital to the defense of that port city. The southern entrance to New York Harbor included a number of sometimes shallow and often treacherous channels that wound through the tidal flats between Sandy Hook and the barrier island that would become known as the Rockaways. Lower New York Bay is made up of several smaller bays, fed by the "North" River, later named the Hudson, as well as by the numerous rivers and streams that drain the interior of New Jersey and Long Island. Chief among these are Sandy Hook, Amboy, Raritan, Gravesend, and Jamaica Bays. To the north, the span of water between Long and Staten Islands known as the New York Narrows is at no point wider than a mile and a half; its channel is even narrower. The Narrows figured prominently in the history of the nation's commercial capitol and for over 150 years the land on either side of this constricted waterway saw the development of one of the most extensive system of coastal fortifications in the world. More than 40 forts and batteries would guard the four-mile passage into New York's inner harbor. Only after World War II would these seacoast fortifications be abandoned, but even then, the military installations at the Narrows continued to serve, some into the 21st century.

The Colonial Period 1524-1775

In 1524, the Italian explorer Giovanni Verrazano, in the service of Francis I of France, entered the Narrows, becoming the first European to visit New York Harbor. After over-nighting in the shadow of the Staten Island Hills, a storm drove the Italian navigator out to sea. Nearly a century would pass before Henry Hudson, in the employ of the Dutch East Indies Company, would sail his small *Half Moon* through the Narrows in 1609 to explore the lower reaches of the great river that would later bear his name. He named the island bounding the Narrows on the west *Staten Eylandt,* for the States-General of the Netherlands. In August 1613, Dutchmen Adrian Block and Hendrick Christiansen sailed their vessels through the Narrows and up the Hudson River to Manhattan, venturing as far as the future site of Albany, where they established trading posts. Michael Pauw, one of the directors of the West India Company, purchased Staten Island from the Indians, together with an extensive tract in the future Bergen County, NJ, August 10, 1630, and the whole tract received the name of Pavonia. David Pietersen deVries established the first *Staten Eylandt* community in 1631. DeVries erected a blockhouse and signal station on the heights of Staten Island above the Narrows in 1632 in an attempt to afford some measure of protection to the fledgling community. It was a very desirable spot, and the Indians, who seem never to have considered they lost possession by sale and were always willing to convey for a consideration, resold the island about 1638, to Heer Melyn, with the permission of Governor Kieft, and subsequently in 1657 to Baron Van Cappellan. Melyn and Van Cappellan both made improvements.(1)



1781 map of the Harbor of New York, prepared by John Lodge. *NYPL Collection*

The Dutch colony of *Ould Dorp* on Staten Island had been the site of these initial weak defenses, the chief intent to ward off marauding Indians. The colony collapsed, however, when many of its inhabitants were massacred, and the remainder carried off captive by the Indians in 1655. A subsequent blockhouse measuring 18 by 20 feet was armed with two small cannon. A new colony named *Niewe Dorp* was established at the later site of Miller Field.(2)

The Long Island side of the Narrows was known as Najack in May 1643, when the pirate Antony Jansen Van Salee was granted about 200 acres near a cove that would become known as Gravesend Bay. The earliest attempt to settle the area on Long Island that would later become Fort Hamilton came in 1652, when Corneilius Van Werckhoven secured a patent to a tract of land there. That venture proved unsuccessful, however, and the first recorded evidence of defenses was a blockhouse erected in the middle 1650s as protection against marauding Indians by Jacques Cortelyou, the founder of the town of New Utrecht.

In December 1664, the English, having claimed the area, named it for the Duke of York, the brother of the king. They sent four warships and 450 men under Col. Richard Nicholls to seize New Amsterdam from the Dutch. Nicholls landed at Najack Cove (Gravesend Bay) and soon afterward the Dutch surrendered the colony to the English. Both the Dutch in the 1660s and the English during the late 17th and 18th centuries made proposals for fortifying the heights overlooking the Narrows. In 1701, Colonel W. Romer's recommendation for a battery of thirty 4-pounders on New Utrecht Heights was rejected by the British Royal Governor. The French threat in 1702 again raised the issue of defending the Narrows, but the threat subsided and no work was done. Even the more serious French and Indian War failed to result in the erection of defenses at the Narrow. Not until the late 1770s were any substantial measures taken to fortify the passage into New York's inner harbor.(3)

Southern New York's Defenses in the Revolutionary War 1775-1783

Early in the American Revolution, Signal, or Flagstaff, Hill on Staten Island was used as a lookout and signal station, with a detachment of colonial militia on watch for the Royal Navy. Across the Narrows on Long Island, two cavalry troops of Kings County Militia patrolled between New Utrecht and Rockaway. By the spring of 1776, Col. Edward Hand's Pennsylvanians (1st Continental Infantry), 470 officers and men, were already on Long Island, having come from Boston in advance of the rest of Brig. Gen. Nathanael Greene's well armed and disciplined brigade. Hand's men scouted and patrolled at the Narrows and along the coast. Greene's Brigade, consisting of Hand's Pennsylvania riflemen, two Rhode Island regiments under Cols. James Mitchell Varnum and Daniel Hitchcock, and Col. Moses Little's Massachusetts regiment arrived in April and took up positions on the Long Island hills overlooking the Narrows.(4)

On the approach of British ships to Sandy Hook, black and white kegs hoisted on the flagstaff atop Signal Hill warned Washington's Continentals in Manhattan. On July 4, 1776, the initial British troops landed on Staten Island, where they established their primary base for the capture of New York City. The only opposition was a small battery on the Long Island shore near the future site of Fort Hamilton, which fired on HMS *Asia*, a 64-gun third-rate ship of the line, inflicting some damage, and killing one British tar and wounding nine others.

On June 25 and 26, three or four more large ships anchored off Sandy Hook, one being the 44-gun 6th-rate frigate HMS *Greyhound*, with Gen. William Howe, British commander-in-chief in America, aboard. At Sandy Hook, Howe met with New York's royal governor, William Tryon, and other loyalists on board *Greyhound*, where they provided substantial information regarding the state of the American army then strongly entrenched on Long Island, noting that more than 100 cannon were emplaced to defend the town against an attack from the sea.(5)

By June 29, a fleet of 45 sail had arrived off the Hook, joined four days later by another 130 vessels when the fleet from Halifax arrived with Howe's 6,155 troops from Boston. General Howe had originally intended to disembark his army on the Long Island coast near the Narrows, but finding that the Americans were posted along a ridge of hills known as the Heights of Guian not far inland, Howe landed his troops on Staten Island and went into camp to wait the arrival of Admiral Lord Richard Howe, his older brother, enroute from England with additional troops. In mid-July, Admiral Howe arrived with some 11,000 more troops crowded into nearly 215 warships and transports. These troops joined those on Staten Island. On August 1, there was an unexpected arrival in the shape of the discomfited Charleston expedition, about 2,000 more troops under Generals Clinton and Cornwallis, who before the war's end would finally gain a foothold in the South. Finally, on August 12, 1,000 troops from the British Brigade of Guards and 7,800 Germans organized into four brigades commanded by Lt. Gen. Leopold Phillip de Heister arrived after a tedious voyage of 13 weeks from Portsmouth, via Halifax. Thus completed, the Howe's force eventually reached 31,626 troops and over four hundred vessels.

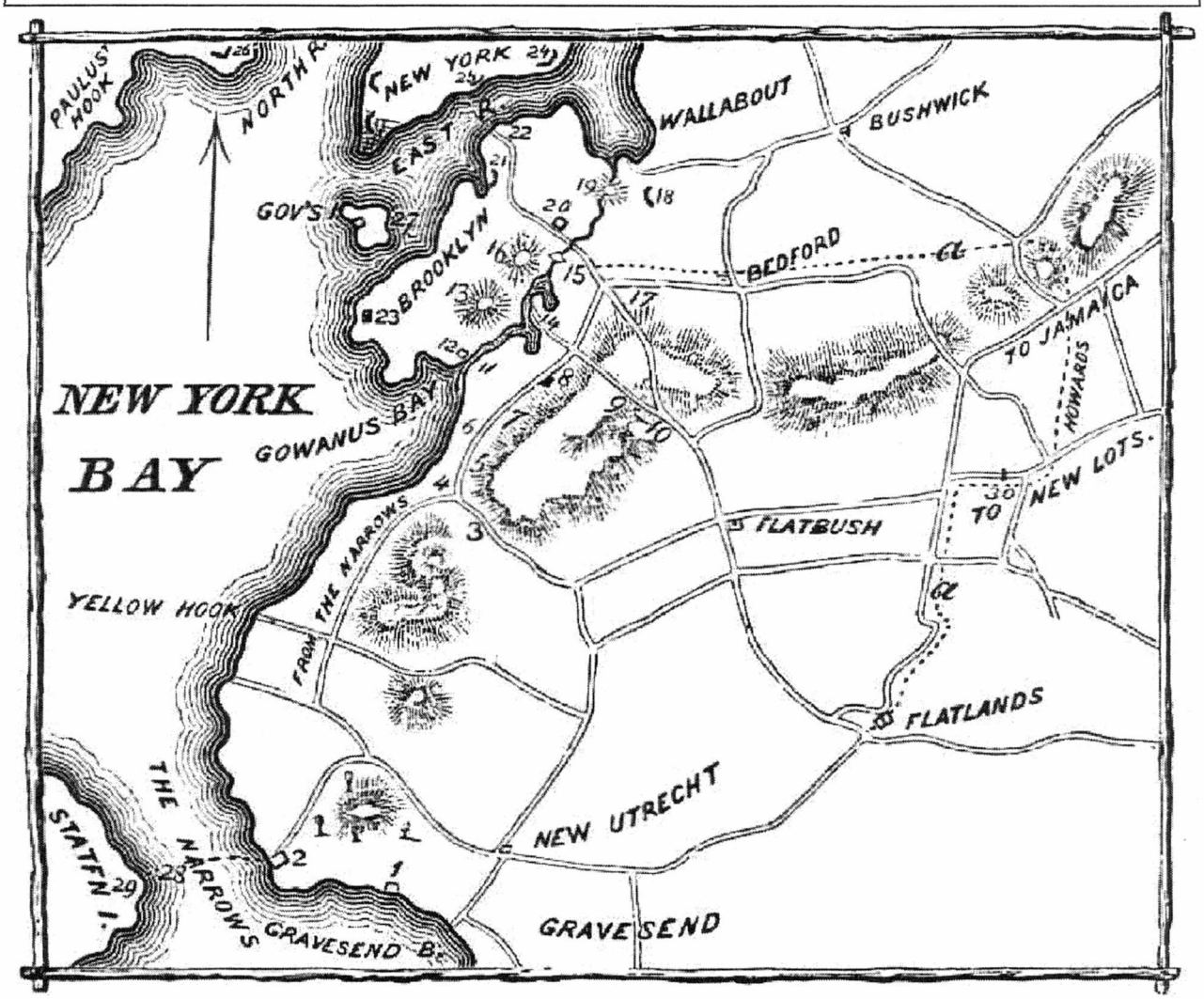
After assembling their army, the Howe brothers lost little time moving against the colonists. While Howe's army was getting organized, two British frigates, HMS *Rose* and HMS *Phoenix*, took advantage of a brisk breeze and running tide. With their tenders, they moved up through the Narrows on July 12 and ran by the meager American batteries in the inner harbor and up the North (Hudson) River unscathed. They kept as much as possible to the Jersey shore, more distant from American batteries on Manhattan, which did them little damage. The two frigates, however, managed to instill considerable terror among the citizens of New York as they bombarded Manhattan with their 24-pounders. Finally, on July 16, the Americans sent two fire-rafts downriver, one of which managed to set a tender ablaze. An expected repeat encouraged the two vessels to withdraw July 18 to the shelter of the British fleet occupying New York Bay.

Across the Narrows on Long Island, Colonel Hand's riflemen and other elements of Greene's Brigade maintained a close observation of the Narrows and the British camps on Staten Island from near New Utrecht, reporting any suspicious movements of the fleet. When word was brought in on August 9 that a large number of British regulars were assembling at the Staten Island ferry landing, General Greene immediately alerted his brigade.

Lord Howe had carefully developed his plan to suppress the rebellion, and decided to advance by crossing over to Long Island, and after landing at Gravesend Bay, to move against the American works at Brooklyn guarding the land approaches to New York proper. A portion of his fleet had been sent through Long Island Sound to approach the city by way of the Hell Gate. This force, accompanied by a flanking move through Westchester County, would force Washington to evacuate New York even if the British were unable to dislodge the American from their lines at Brooklyn.(6)

Colonel Hand's outpost sent word that the British were preparing to cross to Long Island from Staten Island at dawn on August 22. After days of expectation and suspense in the American camp, the British commenced their move against Washington's Army. At dawn three frigates - HMS *Phoenix*, *Greyhound* and *Rose*, with bomb-ketches HMS *Thunder* and *Carcass* – entered Gravesend Bay to cover the landing, while Sir George Collier in the 44-gun frigate HMS *Rainbow* moved opposite Denyse's Ferry, the future site of Fort Hamilton, to silence a suspected American battery.

Later in the morning, the British began transporting troops from Staten Island to Gravesend Bay, a mile east of the Narrows. On Staten Island, 15,000 fully equipped British and Hessian troops, with 40 artillery pieces, had been brought up, and a portion were re-embarked on transports in the lower bay for transit to Long Island Sound. On the beach at Staten Island were two galleys, 11 bateaux, and some 75 flatboats manned by the Royal Navy. A second British force, some 4,000 men under Sir Henry



Long Island showing the Narrows and the locations of the British landings. *Author's Collection*

Clinton and Lord Charles Cornwallis, including Von Donop's corps of Hessian jaegers and grenadiers, crossed in small boats to Denyse's Point, where they landed, supported by the fire of HMS *Rainbow*.

The British landing at Gravesend Bay was unopposed and at Denyse's Point only about 200 men of Colonel Hand's 1st Pennsylvania offered brief opposition before retreating to Prospect Hill, burning or otherwise destroying any property or supplies. The British boats returned to Staten Island and took almost 5,000 more men and about 40 cannons to Gravesend Bay by noon. The Americans, unable to prevent the landings, were pushed back.

Later that day, Sir William Howe landed at Gravesend Bay with an additional 5,000 troops. The British force on Long Island, which had grown to about 22,000 men, struck the Continentals between Gravesend Bay and Brooklyn, inflicting severe losses in a series of blows along the Heights of Guian on August 27. The Americans were driven back into their strong entrenched line on Brooklyn Heights, the high ground that extended from Wallabout Bay to Gowanus Creek, while Howe commenced formal siege operations against Washington's small army. While adverse winds and tides prevented the British fleet from taking an active role in the siege, one 44-gun frigate, HMS *Roebuck*, engaged Fort Defiance on Red Hook briefly on August 27. After a council of war with his subordinates on August 29, General Washington withdrew from Long Island to Manhattan, leaving the British in command of

both sides of the Narrows and ultimately New York City. The absence of adequate defenses at the Narrows and the loss of New York would be indelibly etched in American military minds for decades.(7)

The first efforts to construct viable fortifications along the shoreline of the Narrows were made by the British on Staten Island soon after seizing New York. Numerous redoubts were also thrown up on the hilltops behind the shore batteries to protect their land approaches. The first, completed about 1778, was designed by British engineer Captain-Lieutenant John Montressor. The earthen redoubt atop Signal Hill was armed with four 18-pounders, covering a battery of some twenty-six 24-pounders on the slopes below the redoubt. Over time, this came to include two more redoubts and a four-bastion fort named Fort Stag Stake, along with several more supporting barbette batteries projected to mount about 65 guns. Eventually, 15 or more earthwork redoubts and batteries would become the first significant works to occupy what would become the Fort Wadsworth Military Reservation of the 19th and 20th centuries. The British occupied Staten Island until 1783.

Across the Narrows on Long Island, Montressor also planned and built a pair of small lunettes on New Utrecht Heights early in 1778 to prevent the Americans from recapturing New York. One, for 10 guns, was built south of the Cortelyou wharf and homestead while the other, for 15 guns, was north of Denyse's wharf and home. A third battery of 10 guns was about midway between the two lunettes. These works remained in British hands through the remainder of the war.(8)



The Narrows showing the system of fortification planned by Montressor. *Author's Collection*



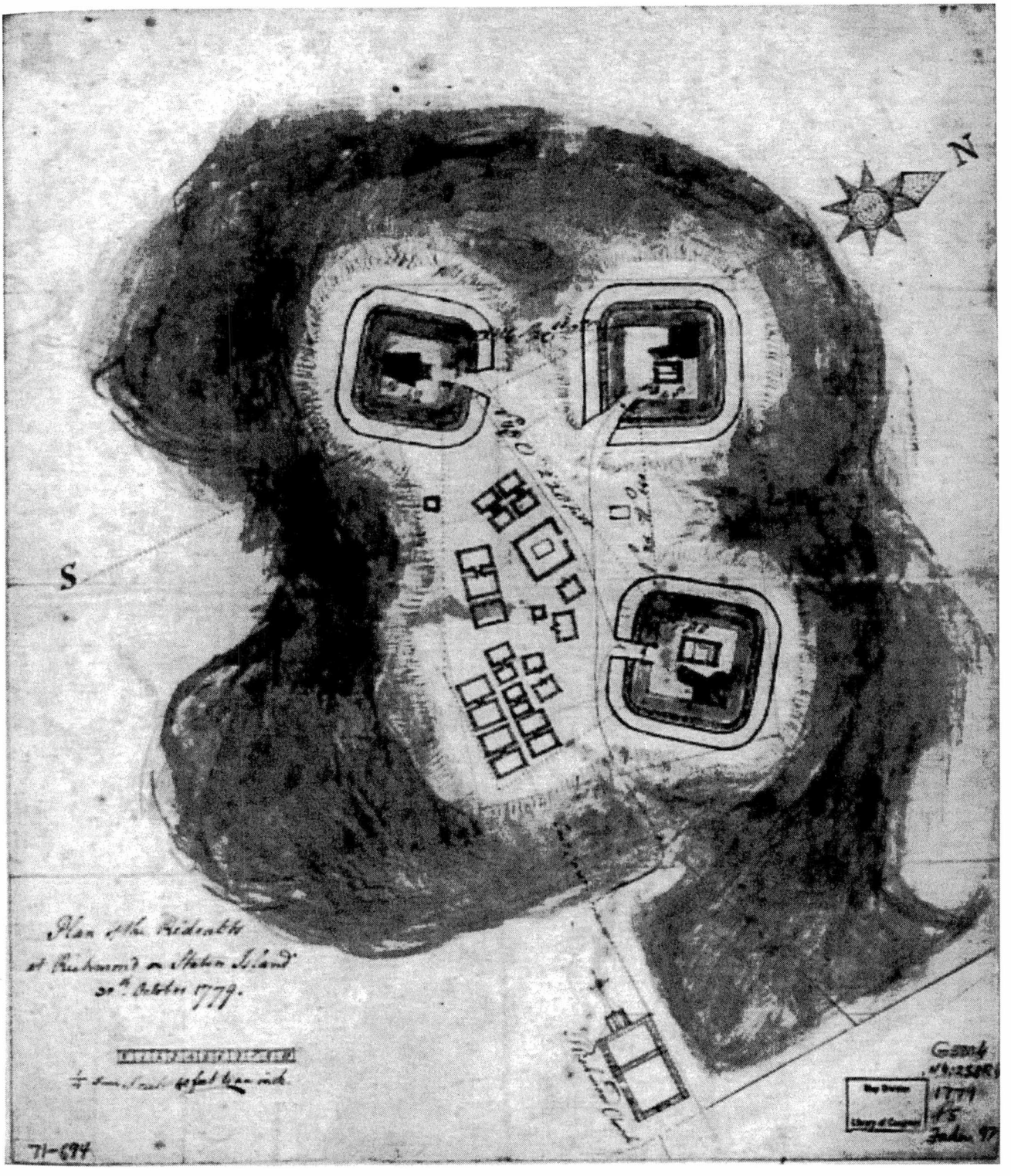
British engineer Captain-Lieutenant John Montressor.
Author's collection

Early in the Revolutionary War, the authorities in New York decided the lighthouse at Sandy Hook should be destroyed or its lighting apparatus dismantled, to prevent its falling into British hands. In March 6, 1776, Maj. William Malcolm received orders to "take the glass out of the lantern, and save it if possible; but if you find this impracticable you will break the glass. You will also endeavor to pump the oil out of the cisterns into casks, or not being able to procure casks, you will pump it out onto the ground. In short, you will use your best discretion to render the lighthouse entirely useless." Malcolm must have had some success, as a letter to Col. George Meade dated March 12 states: "Received from Wm. Malcolm eight copper lamps, two tackle falls and bocks [sic], and three casks, and a part of a cask of oil, being articles from the lighthouse on Sandy Hook."

The British found Sandy Hook invaluable when they landed on Staten Island in 1776. Their presence at the harbor's southern entrance gave them a firm foothold on the northeastern Jersey shore. Less than three months after Malcolm's raid, the British had repaired the lighthouse, placed it back in operation, and provided a small garrison on the Hook. Another American effort to destroy the Sandy Hook Light with cannon fire came in June 1776. Lt. Col. Benjamin Tupper of the 21st Continental Infantry bombarded the lighthouse with cannon fire, but after an hour, he "found the walls so firm that the cannon fire could make no impression." Because of stiff resistance by the British troops and supporting fire from a frigate in Sandy Hook Bay, Tupper was finally forced to withdraw. The lighthouse was provided with fortifications and a small garrison of Loyalists that kept the Lighthouse Fort, or "Refugee Tower" as it was sometimes termed, in British hands until the end of the war, along with the lighthouse and Sandy Hook.

The British Army withdrew to the vicinity of Sandy Hook after their defeat at the Battle of Monmouth, June 28, 1778. Fearful of being trapped on the Hook, the British were evacuated to New York.

The 1778 alliance between America and France soon brought a large French expedition to America. A massive French fleet under the Comte d'Estaing arrived off Sandy Hook on July 11, threatening Admiral Howe's much smaller British squadron in the lower bay, as well as the British Army concentrated in the New York area. Howe's 17 vessels were draw up in three lines of battle to block the two channels into the harbor. To augment their defenses, Howe also had some 14 guns in eight batteries along the north end of Sandy Hook to enfilade the channel should the French attempt to engage the British fleet. In this case, nature offered a better defense: the French ships drew more water than the channel depth at low tide, and shoals and d'Estaing's lack of enterprise saved British fortunes. On July 22, the French sailed away for Narragansett Bay.(9)



Plan of British redoubts at Richmond, S.I., later the site of Fort Smith, Oct. 30, 1779.

At the end of the Revolution, the works on both Staten Island and Long Island were evacuated by the British, who withdrew into Manhattan preliminary to departing for home. The large crowd of civilians gathered on the ramparts of Fort Stag Stake's on Staten Island's Signal Hill, November 25, 1783, jeered as the departing British troops sailed down the Narrows. Smarting from their defeat and the derision of the Staten Islanders, the crew of one of the British warships fired a round at the crowd on Signal Hill, but it fell far short of the intended target.(10)

First System Works Planned for the Narrows 1794-1805

By the 1790s, the works built during the Revolution were in an advanced state of deterioration. On April 1, 1794, Secretary of War Henry Knox appointed a French émigré military engineer, Charles Vincent, temporary engineer in the service of the United States, to plan and oversee fortifications at New York. In 1794 Vincent surveyed the fortification needs of New York Harbor for the War Department and recommended new fortifications above the Narrows on Long Island's west end and on Hendricks Reef off the Long Island shore. A comprehensive system of works for Staten Island was also recommended near the signal station and Stag Stake Fort on Signal Hill.

Vincent identified the Narrows as the harbor's first line of defense. A signal station equipped with two guns should be erected near the Sandy Hook Lighthouse to provide early warning of an enemy's approach. He also proposed a second station at the site of the old British works above Sandy Bay at the Narrows on Staten Island to repeat the signal to "Beatles" in Manhattan. This signal function associated with the defenses was later improved by installing a semaphore signaling system.

At Sandy Bay, Vincent called for an enclosed battery of 15 guns and four mortars at the shoreline. This proposed work would have an enclosed gorge and two 4-pounders to give flanking protection to the gorge, and would be covered by the guns of a fort on the heights of Signal Hill above. A redoubt in advance of the fort at the edge of the cliffs above the Sandy Bay fort, armed with six guns, would be connected to the Signal Hill fort by a covered way armed with mortars. Another redoubt to be erected in time of war on the crest of Cherry Hill would cover the rear approaches to the Staten Island fortifications. The Cherry Hill redoubt would also be connected to Signal Hill fort by a double covered way.

For the Long Island side of the Narrows, Vincent recommended a battery of 15 guns "of the largest caliber on seacoast carriages," along with four 10-inch mortars, on Hendricks Reef, a shoal some 400 yards off the Long Island shore. The gorge of this battery was also to be closed and commanded by a redoubt, to be built wartime, on the heights behind the battery. Farther down the Long Island shore at New York Bay, Vincent proposed a battery for two guns on traveling carriages, possibly protected by a small redoubt, to discourage enemy landings below the Narrows. He also called for an entrenched militia camp on Long Island between the battery at New York Bay and Hendricks Reef.(11)

Scarcely had Vincent completed his preliminary study of the harbor's defense needs when he modified his recommendations, probably as a result of pressures from the governor and local officials. An additional blockhouse, to be built during time of war, was added to the Staten Island plan. These proposed works remained on the drawing board, however, as the limited funds appropriated in the 1790s and early 1800s were allotted to the defense of the inner harbor.

The concept of fortifying the Narrows was not abandoned, however, and during the early years of the 19th century, a number of additional surveys and studies were undertaken. Bureaux Pusy and Joseph Mangin examined the defenses of New York Harbor for the Engineer Department in the autumn of 1801. In a lengthy memoir later that year, they pointed out that the existing works on Governor's Island and the Oyster Islands in the inner harbor were too close to the city to adequately defend it from a hostile squadron. Even the proposed works at the Narrows would fail to meet the defense needs of the

harbor as they could be circumvented by landing an army on Long Island or Staten Island below the Narrows and taking the proposed fortifications from the rear. Perhaps recalling the British occupation of Sandy Hook in the Revolution, Pusy further recommended, for the first time, a series of works at the southern entrance to New York Bay, between Rockaway Point and Sandy Hook, on the East Bank and Middle Ground shoals on either side of the channel, supported by a large fort on Sandy Hook with exterior batteries.(12)



Col. Jonathan Williams. *Corps of Engineers*

A. Laiarriere, a civilian engineer employed by the City of New York, studied New York Harbor and on December 23, 1804, submitted his report to Mayor DeWitt Clinton, who forwarded the proposals to the secretary of war. After considering the southern entrance to the lower harbor between Sandy Hook and Coney Island and the shoals on either side of the channel, Laiarriere recommended the Narrows as the principle place of fortification. There, near Long Island on a shoal known as Hendricks Reef, Laiarriere called for a powerful semi-circular battery of 32 heavy guns, protected in its rear by an angled front armed with smaller guns and mortars and loopholed for musketry. On the Long Island high ground behind this battery, he proposed a fort with the trace of a bastioned parallelogram, with a dozen mortars and 21 guns to cover the battery on the reef.

Across the Narrows on Staten Island, Laiarriere recommended another curved battery mounting some 60 heavy guns, probably at Sandy Beach below Signal Hill. On the heights of Signal Hill, a work of the same type as proposed for the heights on Long Island would command the battery below it. When completed, the projected works on either side of the Narrows would cross their fire with more than 100 heavy guns and mortars, making it virtually impossible for a hostile fleet to sail into the upper harbor without severe losses. The cost of these works was estimated at $2,000,000. In closing, Laiarriere, called for a detailed survey and for sounding the waters between Coney Island and Sandy Hook and of the Narrows itself.(13)

Second System Works are Planned and Built 1806-1812

In the later part of September 1805, Secretary of War Henry Dearborn following up on a New York State proposal, wrote Col. Jonathan Williams, the army's chief engineer, requesting he determine the precise width of the Narrows, as well as the exact distances between the harbor islands and between the islands and the Manhattan Battery.(14)

Williams, accompanied by a small party of engineers and cadets from West Point, carried out his study of the harbor later in September and reported to Dearborn:(15)

> The width of the Narrows in various parts within one thousand yards, nearly the length of the bases measured on each side, is from 1847 to 1916 yards according to the various deflections of the shore; in the course of the shoal the width will not exceed nineteen hundred yards from the edge of the water on each side. It may therefore be concluded that this reef reduces the width of the ships channel to 1350 yards.
>
> As the shore on one side and reef on the other are very bold the addition of five or six feet at high water would cause but little spread in the width of the channels; it is besides only at half tide that an enemy would make an attempt in order to have the full strength of the current and to prevent taking ground with the tide at the highest.

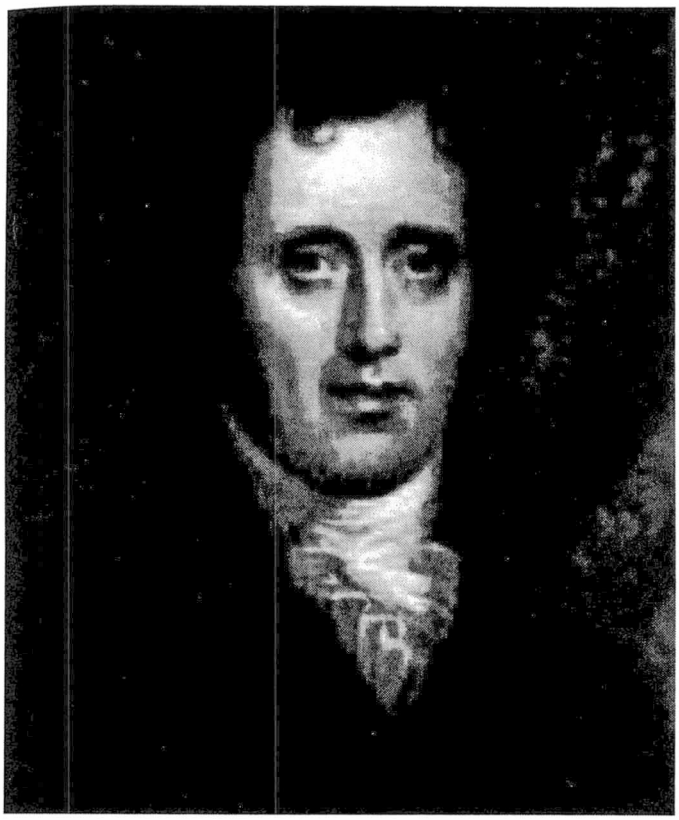
Improvement of the harbor fortifications took on a greater urgency on April 25, 1806, when the coastal sloop *Richard* was fired into by HMS *Leander* only a quarter-mile off Sandy Hook, killing the sloop's master, John Pierce. This was only one of several provocations by the Royal Navy in the early years of the 19th century that would prompt a second war with Great Britain and new works at the Narrows.(16)

Signal Hill, where the British had built Fort Stag Stake and the two Fort Tompkins, would later be built, continued as a semaphore station to relay shipping arrivals from a station at Sandy Hook to the Battery at Manhattan. Although measures were taken to strengthen the works in the inner harbor, the Committee for Defense of the Corporation of New York continued to express its concern that no efforts were being made to fortify the Narrows, and voiced this concern to Colonel Williams. In the meantime on March 20, 1807, the New York Legislature conveyed title and jurisdiction for two acres on Hendricks Reef Shoals to the United States. Williams responded to the committee on July 25, 1807, reassuring them that he, Vice President George Clinton (a New Yorker), and Secretary Dearborn had in no ways rejected defenses at the Narrows, and only the limited funding and the necessary planning was delaying development of a strong battery on Hendricks Reef. Nothing was said regarding Sandy Hook.(17)

New York State Erects Fortifications on Staten Island 1808-1812

The various surveys carried out by Charles Vincent in 1794, by Mangin and Pusy in 1801, Laiarriere in 1803, and Jonathan Williams in 1805, consistently recommended defenses on both sides of the Narrows. During the spring of 1807, the legislature authorized ceding the federal government lands for fortifications at the Narrows on Staten and Long Islands, and a State Board of Fortifications was appointed, composed of DeWitt Clinton, James Fairlie, Jacob Morton, Peter Curtenuis, and Arthur Smith. This board called upon Colonel Williams to prepare an extensive plan for fortifying New York and its harbor. In April 1808, the legislature appropriated $100,000 to expedite the erection of defenses called for by the governor and the Board on Fortifications. Upon succeeding Henry Dearborn as secretary of war, William Eustis lost little time taking charge of the War Department. On May 4, 1808, Eustis instructed Williams to lend his good offices to the governor and provide his full assistance to the state by preparing plans and drawings, and sharing defense plans, etc, but to avoid advice on how the funds were to be expended.(18)

In 1807 the State of New York ceded "lands covered with water between Long and Staten Island" and on Bluffs Point on Staten Island to the federal government for fortifications. However, it was not until the latter months of 1808 that measures were finally taken to commence the proposed fortifications.(19)



Daniel D. Tompkins, Governor of New York.
Author's Collection

On September 27, 1808, Secretary Eustis wrote Governor Tompkins with orders for Colonel Williams to attend the governor in an examination of potential fortification sites on Staten Island at the Narrows. In conformity with those orders, Tompkins and Williams traveled down New York Harbor to the Narrows aboard the latter's cutter. The weather was so "boisterous" that the trip consumed four days. Landing at Staten Island, Colonel Williams and Governor Tompkins examined the remains of the old British Fort Stag Stake and its redoubts on Signal Hill, as well as the Sandy Beach site suggested for fortifications by the secretary of war. Williams and the governor concurred with the secretary as to the location for the new works proposed for Staten Island. Returning to the city, Colonel Williams prepared a drawing of the projected work. While its form differed from that formulated by Secretary Eustis, Williams believed it would answer Eustis' purposes.(20)

Williams' initial plan for the defenses was comprehensive, addressing the need for works on both sides of the Narrows. He recommended two circular towers of the type under construction at the west end of Governor's Island (Castle Williams), connected by a curtain wall on Hendricks Reef, all for between 200 and 300 guns. A simple redoubt on the high ground to the rear on Long Island would be sufficient to protect the rear approach to the works on the reef.

Across the channel on Staten Island, Williams proposed building another pair of towers connected by a curtain on Sandy Beach. South of the towers, he recommended an additional battery along the slopes above the Narrows. To secure the Staten Island forts against attack from the rear, Williams noted the importance of Flagstaff Hill. He proposed a strong fort there that could hold out against a land attack, with the usual assortment of ramparts, parapets, scarp, ditch, counterscarp, and glacis on its land fronts, and a low parapet on its Narrows front that would be armed with heavy ordnance to supplement the fire of the towers on the reef. To conserve money, he proposed flanking defenses in the form of half-bastions rather than full bastions at all the salient angles of the work except for the southeast angle, where he would place a circular tower, as there was insufficient ground for a bastion. Williams also noted that there was but one location from which a fort on Flagstaff Hill might be "annoyed," a hillock to the southwest. He recommended acquiring additional land south along the shoreline of the Narrows and the ridge above it, where additional batteries could further increase the firepower bearing on the channel leading into the harbor.(21)

After receiving Williams' report, the state legislature appropriated $100,000 to initiate construction on Staten Island. Williams' plan underwent considerable alteration in the meantime. The twin multi-tiered towers connected by a curtain were transformed into one single-tier curvilinear "marine" casemated battery of red Newark Sandstone, with a gorge enclosed by a curtain. There were no flank-

ing defenses of the gorge scarp. The battery was capable of being increased to two tiers at some future date; in the interim it was to be provided with the shed-type roof over the casemates that had been employed at Castle Clinton off Manhattan's Battery. The work was to be supported by an additional earthen battery extending south down the shoreline.

Instead of the 200 to 300 guns initially envisioned by Williams, the marine battery would be single tier, mounting a mere 25 to 30 cannon supported by another 40 or 50 guns in the battery to the south. The first work undertaken was the marine battery on Sandy Beach at the foot of Signal Hill. Little time was lost beginning construction on the proposed forts and batteries, but progress was slow and it was not until December 28, 1808, that the fort's cornerstone was laid with appropriate ceremony.(22)

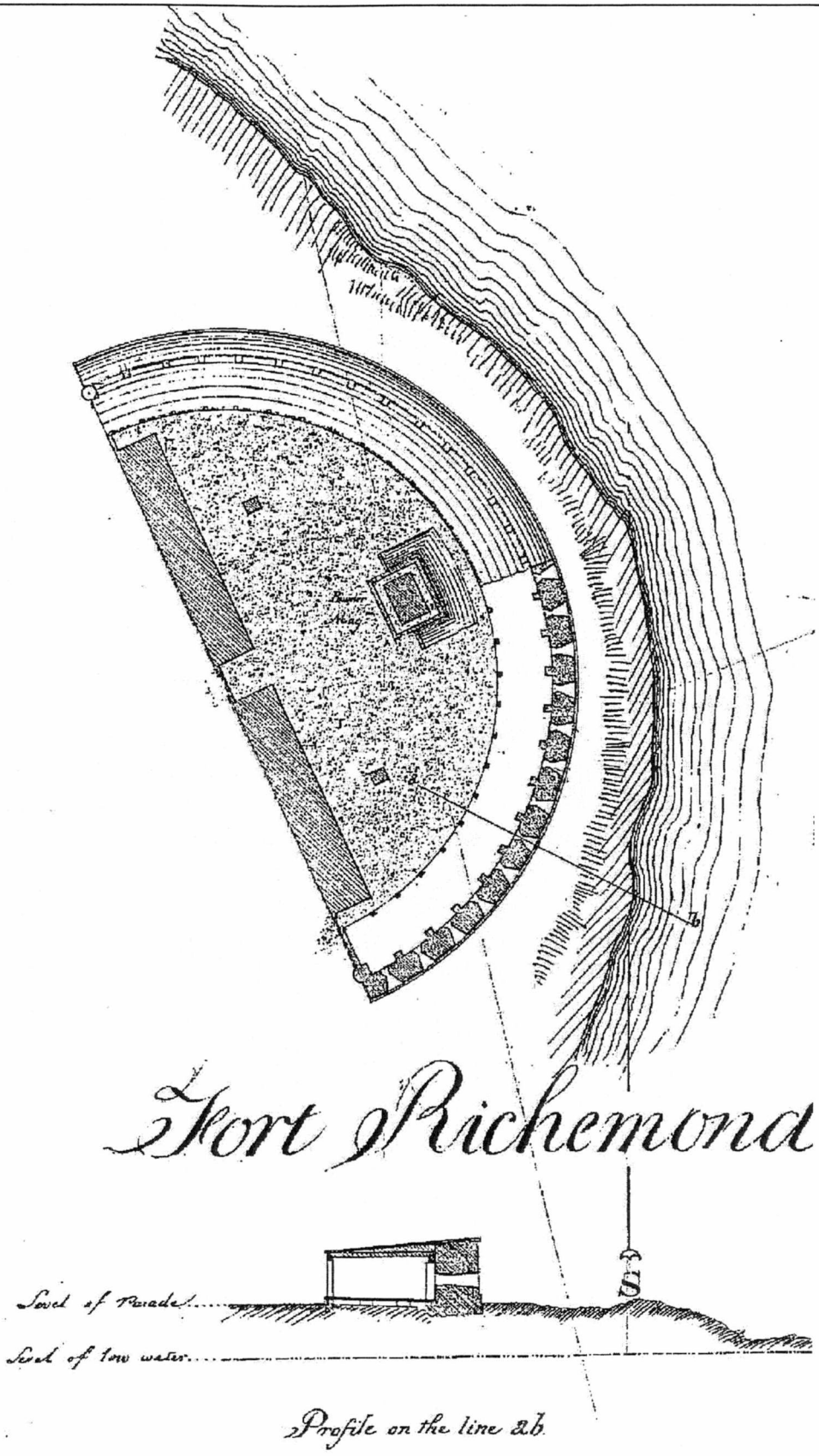
On January 21, 1809, Governor Tompkins wrote President Thomas Jefferson requesting the federal government supply the necessary ordnance for the Staten Island works. In his letter, Tompkins gave a good description of the progress made on Staten Island:(23)

> "...operations have been begun at and near Signal Hill on Staten Island. A Water Battery on the beach directly under the Hill will be soon so far completed, as to receive from 25 to 30 cannon. Excavated retiring batteries at the Southerly point of the high ground are progressing rapidly, and will be prepared in about thirty days to mount 40 or 50 cannon. A few rods southerly of the observatory an open work calculated for 12 guns will be finished during the ensuing week. All the preceeding are commanded by a redoubt to be established on the eminence at Signal Hill. As the latter work is to be of masonry, the only measures which can be taken there until the opening of the Spring are procuring materials, digging the ditches and sinking a Well in which the Commissioners are rapidly progressing. Barracks sufficiently capacious to accommodate 200 mechanics and laborers, have been erected and a wharf constructed for the convenience of landing materials. Upwards of 100 men are at present employed at the works at 25 cents and one ration per day, and in the course of the next week, the number will be augmented to 200.

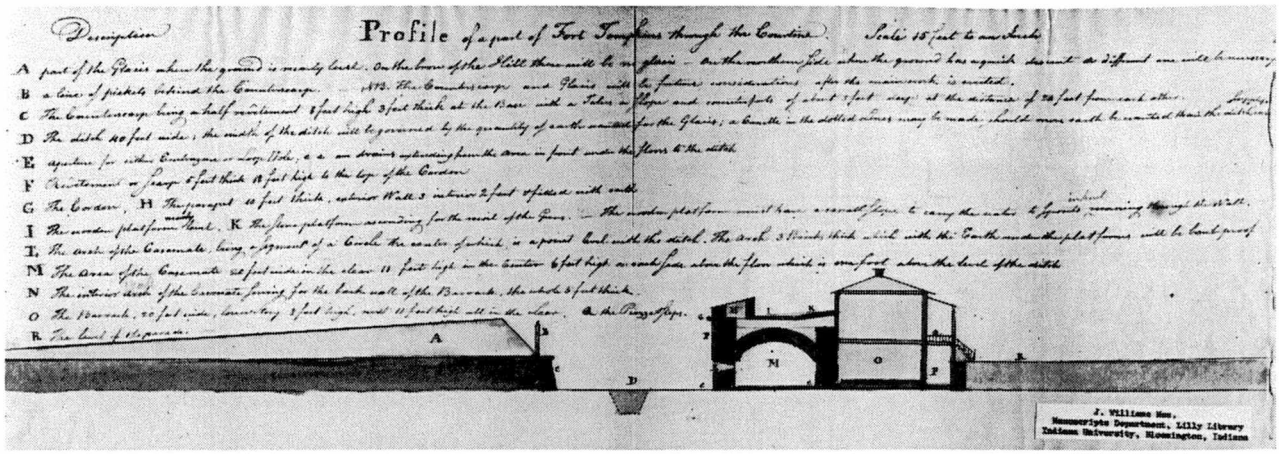
The works begun by the state on Staten Island in December 1808 did not, however, progress as rapidly as the governor had intimated to the President. Tompkins suggested that numerous persons left unemployed and otherwise "out of business," as a result of Jefferson's Embargo be employed on the fortifications projects at Staten Island. By mid-February 1809, according to the State Board on Fortifications, this early 19th century "public works" project was providing employment for some "two hundred to two hundred and fifty persons who are deprived of the ordinary means of subsistence, by the critical state of our national affairs."

DeWitt Clinton, chair of the State Board of Fortifications, reported construction of the works on Staten Island was being advanced sluggishly. On the summit of Signal Hill, the principal work, named for Governor Tompkins, was less well advanced than the battery on the shoreline below. Fort Tompkins was built on the site of old Fort Stag Stake and a British redoubt from 1781. To prepare the site, the west front of the older work was removed and a part of the ditch was excavated "extending from the flanked angle of the bastion and salient angle of the counterscarp of the southwest bastion to the circular tower, and reentering and salient angles about the tower, with a corresponding part of the glacis. The excavation of the tower, [would be] ready for laying the foundation as soon as the season will admit of the materials being procured." Clinton also noted that the well between the southwest rampart and the south wing of the west barracks had been dug to a depth of more than 60 feet.(24)

Before the next session of the legislature, in January 1810 Governor Tompkins called on De Witt Clinton for a report on the state of the works then under construction at the Narrows. Clinton in turn requested Colonel Williams provide him with information on the state of those works. During the next legislative session, additional funding of the state's fortifications was to be considered.



Plan and section of Fort Richmond. *NARA*



Profile of Fort Tompkins through the courtine [sic]. *Williams Papers*

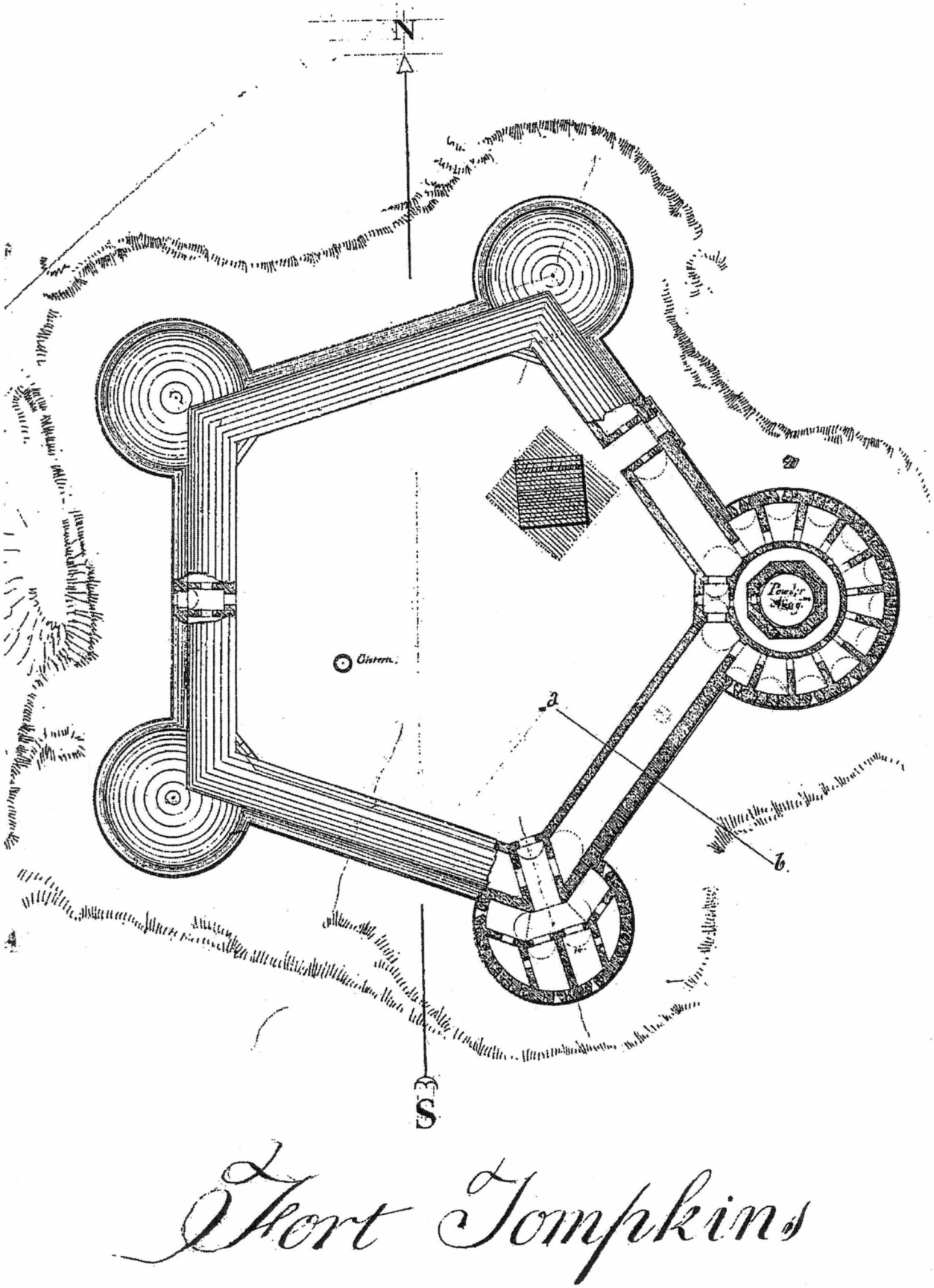
Williams provided a good description of the progress of the plan he had presented to the governor in October 1808 for the defense of the Staten Island side of the Narrows. Fort Tompkins was still far from complete in 1810. Its scarps and two circular bastions of Newark sandstone, however, formed a strong redoubt that protected the rear approaches to the marine battery and the ancillary lower batteries that guarded the Narrows.(25)

Upon completion, Fort Tompkins would be pentagonal in trace, with circular bastions at the salient angles connected by curtains, all of which were casemated. It would measure 1,368 feet along the line of the interior crest of the parapet. The scarp of native brownstone would be five feet thick and 19 feet high. The curtains would be 21 feet wide. A powder magazine would be in the center of the east, and largest, of the five bastions. The first Fort Tompkins had many deficiencies, however: The round towers forming the bastions were poor flank defenses. The fort was subject to plunging fire on its land fronts from the heights to the rear of the fort. The fort had no glacis, covered way, or ditch. The stone parapet was already obsolete. The casemates in the curtains were poorly ventilated, making them unsuitable as quarters, and without embrasures, they could not house armament. The scarp rested directly on the arches of the casemates and had no relieving arches. There were no advanced works to cover the land approaches. Although work continued through the War of 1812, the fort was still incomplete at the end of that war.

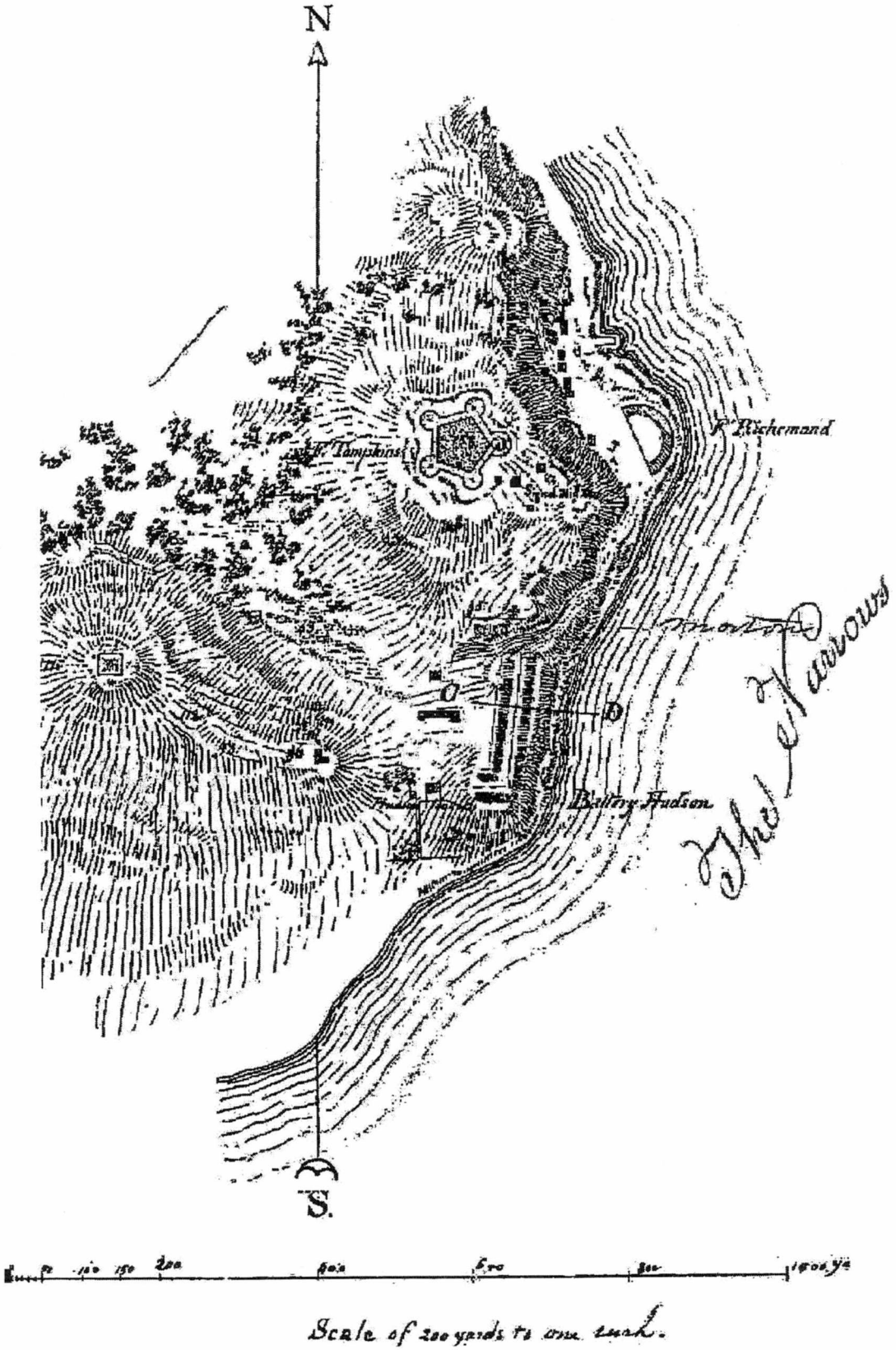
The "marine battery" on Sandy Beach below Signal Hill had been named Fort Richmond, the name of the county encompassing Staten Island. By February 1809, the trench for the foundation had been excavated and the parade ground had been raised one foot above the plane of the site. By 1810, it was ready for its red-sandstone foundation and walls. The fort's crescent-shaped 430-foot waterfront was deemed sufficient for 27 guns *en casemate*. Because the fort's main battery would be so close to the water, ricochet fire would give the fort a decided advantage over higher works.(26)

Williams believed Fort Richmond was in the "best possible position and so fully exposed to fire of the protecting works intended for erection on the hill in its rear, that it will be totally impossible for an enemy, however, numerous to hold it long enough to do any injury whatever."(27)

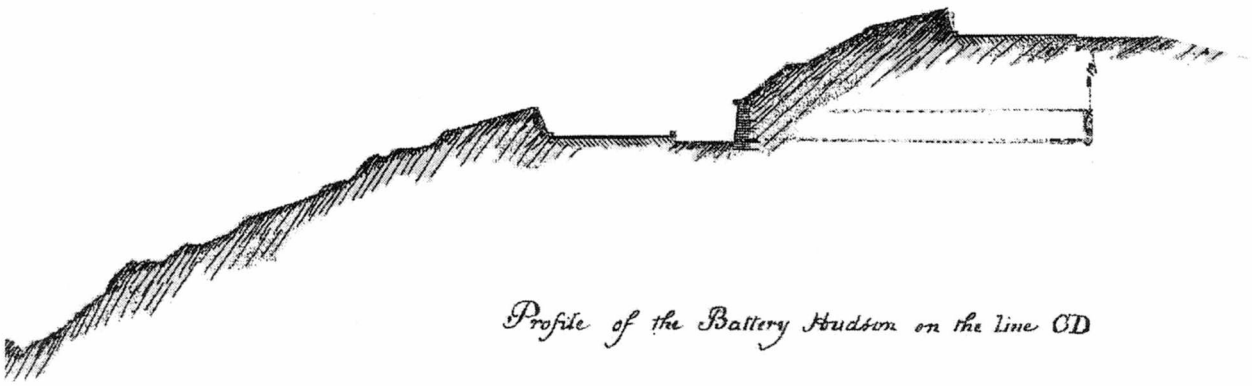
Because of the manner in which Fort Richmond would be constructed, it would be possible to add a second tier of guns with no greater additional expense than an additional height of some 12 feet and another platform for artillery. However, the Second War with Great Britain resulted in the deferral of the second tier and the casemated tier was provided with a timber roof covered with slate, similar to that at North Battery and at Castle Clinton.



Plan of Fort Tompkins. *NARA*



Plan of the works on Staten Island, ca 1819. *NARA*



Profile of Battery Hudson's two tiers. *NARA*

Williams felt that there was room on either flank of Fort Richmond for additional batteries mounting another 10 to 15 guns. These works would also protect the approaches to Fort Richmond by either flank and would in turn be protected by the guns of the fort. Williams recommended that two traverses be thrown up on the parade ground inside the fort to protect the interior from ricochet fire, with a magazine between these traverses in the rear of the fort. Two shot furnaces were suggested to occupy the space between the rear of the battery casemates and the traverses.(28)

To the south of Fort Richmond along the Staten Island shore, curving around the southern point of the entrance to the Narrows, Williams recommended a second battery some 670 feet long, mounting 48 guns 68 feet above high water. This work was subsequently named Fort, and later Battery, Hudson. The board noted that the excavation for this southernmost earthen battery on the hill was:(29)

> "...nearly half complete including two hundred and fifty eight feet of its epaulement; and should the ensuing season prove favorable; will in all probability in the course of two months be ready to mount thirty five pieces of cannon."

Fort Hudson was initially composed of two earthen barbette batteries terraced one above the other. The lower tier was 68 feet above high water and 670 feet long, for 47 smoothbore guns in 1810. Above and to the rear of this lower battery was the 480-foot upper battery for another thirty-two 24-pounder smoothbore guns. Both earthworks were faced and revetted with stone. The upper tier had a parados in its rear.

In the immediate rear of this battery and another 41 feet farther up the slope was a 173-foot earthen "cavalier" battery for 12 guns. This work, slightly curved, was named Fort Morton upon its completion and later Battery Morton. Fort Morton fully commanded Fort Hudson and supplemented its direct fire on the Narrows. Its parade had been fully excavated and its 173-foot parapet was complete. As soon as weather conditions permitted, it was proposed to lay the platforms for its 12 guns.(30)

Because of the talus of the slope down to the shoreline, no enemy vessel could successfully pass beneath the guns. To prevent the erosion of the parapets on the hillside, Williams called for construction of a stone revetment on the superior slope of the parapets, with spouts to direct heavy rains down the slope without damaging the works.(31)

When the State Board of Fortifications made its report to Governor Tompkins in February 1811, it noted Colonel William's view of Fort Hudson's importance and concluded that its upper tier should be finished "in the best manner; and . . . accordingly faced with a wall of solid masonry." The parade grounds of both the upper and lower tiers of Fort Hudson were now finished and foundations for 82

gun platforms had been laid. Fort Richmond had a pair of shot furnaces and a parade wall along the rear line of the casemates, "as well as for the protection of the men who may be stationed in the fort, as for securing the platforms and gun carriages from injuries of the weather." Fort Richmond was armed with 24 iron 24-pounders, on old garrison carriages no longer considered fit for service, with 500 round shot. Additionally, there were two 12-pounder brass pieces on travelling carriages.(32)

Still another battery of 12 guns to command the channel was projected by Williams some 374 yards north of Battery Hudson and 308 yards east of Fort Tompkins, to command both this new battery and Fort Richmond from the heights of Flag Staff Hill. A battery on this site, however, was not begun until 1872, when the Glacis Mortar Battery was undertaken.(33)

The War of 1812

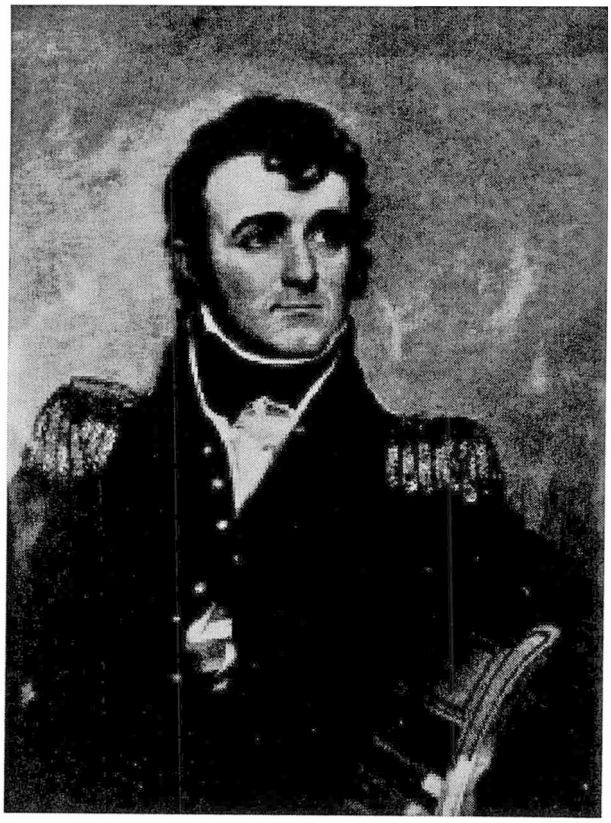
When hostilities opened between Great Britain and the United States on June 18, 1812, the defenses covering the southern approaches to New York Harbor, while considerable compared to other harbors, were hardly overwhelming. Since 1807, $115,000 had been expended on Staten Island's Fort Richmond and Batteries Hudson and Morton that constituted the harbor's first line of defense. These works were armed with twenty-four 32-pounder and fifty-three 24-pounder smoothbore guns. Beyond the long abandoned Revolutionary War earthworks on Denyse's Heights at New Utrecht, there were no works on the Long Island side of the Narrows. Construction of the fort on Hendricks Reef, projected for many years, had not yet begun. Below the Narrows, there were no defensive works at the Navesink Highlands or Sandy Hook, NJ, or at Rockaway on Long Island. The signal station between Staten Island and the Brooklyn Navy Yard had quickly been placed in service by June 23.

At the beginning of the war, Secretary of War William Eustis considered 3,000 men necessary to man the works inside New York Harbor, exclusive of those at the Narrows. There, several militia artillery companies and 500 infantry from New York, and for a brief period, New Jersey, manned Staten Island's batteries. The militia was soon joined by a brigade of Regular Army infantry.(34)

The fortification of New York's Harbor was upset by Colonel Williams' July 31, 1812, resignation from the army over the right of engineer officers to command troops of other branches. Colonel Williams had been more than a little disturbed by the appointment of New Jersey Governor Joseph Bloomfield as brigadier general on March 27, 1812, to command in New York Harbor. Williams considering himself the better choice, and Bloomfield, a former officer in the Continental Army who continued to hold office as Governor of New Jersey, ill equipped for such an important command. As a consequence, Williams tendered his resignation from the army on July 10, 1812. While Williams' resignation was under consideration by the President, Secretary Eustis wrote Williams that the Committee of Defense at New York had appealed to him to "prepare a report stating whether it is practicable, by sinking a pier of stone on Hendricks Reef, and by means of hulks & a suitable counter pier, on Staten Island, to suspend the chain now lying at Governors Island, across the channel at the Narrows: and if it be practicable, in what time it may be effected, together with an estimate of the expense."(35)

The next ranking officer in the Corps of Engineers was Col. Joseph G. Swift, then engineer in charge of the defenses along the Carolinas and Georgia. Swift was promoted to chief engineer and ordered to New York to succeed Williams. Williams' principal assistants at New York, Maj. George Bomford and Lt. William Cutbush, continued to supervise the various fortification projects underway in the harbor pending the arrival of Colonel Swift. In September 1812, Capt. Samuel Babcock arrived in New York and assumed temporary command of the New York fortifications. He succeeded Major Armistead as engineer in charge in New York Harbor when Armistead was ordered to the Niagara Frontier as chief engineer of the forces in the field.(36)

The first six months of the war went somewhat calmly in New York. It was not until early in 1813 that Admiral Warren arrived off Sandy Hook with three, third-rate, 74-gun ships of the line (HMS *Ramilles*, *St. Domingo,* and *Dragon),* a 38-gun frigate HMS *Satira,* and two 18-gun brigs HMS *Sophie* and *Colibri,* to begin the blockade of New York Harbor. Concerned that the British would attempt passage into New York Harbor, the Staten Island batteries went on alert. Shot furnaces in Batteries Hudson and Morton were fired up and the garrison bolstered with additional militia. Initially, however, the Royal Navy limited its activities to a loose blockade, conducting minor incursions into the lower bay to interfere with fishing and prevent American intelligence gathering, as well as to obtain their own intelligence.



Col. Joseph G. Swift. *Corps of Engineers*

New York's Harbor was probably better protected by nature than military force. The shoals on either side of the constricted and shifting channels in the lower bays and the Narrows made maneuvering large ships of the line difficult, and the constantly shifting Middle Ground Shoal at the entrance to the lower bays made entering the harbor a complicated venture. An American flotilla that eventually grew to 40 shallow-draft gunboats and barges was manned by about 1,000 "Sea Fencibles." This force was assembled in New York Harbor under Capt. Jacob Lewis, USN. A portion of Lewis's command was kept in the lower bay to oppose any attempt by Admiral Warren to enter Sandy Hook Bay. Lewis was later ordered to reduce the number of gunboats to 15 because of the expense of manning them, much to the consternation of city and state authorities. When the blockading British appeared to be moving against the lower waters of the bay in January 1813, Lewis moved down the harbor to oppose them, but turned back because of thick ice in the lower harbor. The weather and other natural obstacles apparently forestalled the British efforts as well.

Additional works were erected on Sandy Hook. Governor Tompkins reported to the legislature March 13, 1813 that "work had also been begun on Sandy Hook." Two or three cannon were located at the lighthouse, primarily as signal guns in the event of an enemy approach and to fend off small raiding parties from the blockading squadron, but the fortifications were generally insignificant. A large fort on Telegraph Hill at Navesink Highlands some three miles from the Lighthouse was in direct communication with Signal Hill at Staten Island. By the end of March 1813, the Telegraph Hill fort was manned by five companies of artillery with 32-pounders, and three companies of infantry.(37)

Colonel Swift Continues Colonel Williams' Projects

On April 1, 1813, Colonel Swift arrived in New York from the Carolinas and on April 6 reported to Brig. Gen. George Izard, who commanded the United States forces in New York City. Izard, who had succeeded Bloomfield, placed Swift in command of Staten Island and a brigade composed of the 32nd and 41st Regiments of U.S. Infantry. In addition, Swift also assumed direct charge of the engineering works at the Narrows on Staten Island and at New Utrecht on Long Island.(38)

On April 15, Swift began to repair all the forts in the harbor and to erect blockhouses at Denyse's Hill near New Utrecht in the rear of Hendricks Reef, at Jamaica Bay on Long Island, Princess Bay on Staten Island, and Sandy Hook, NJ, to deter raiding parties from Admiral Warren's blockading squadron off Sandy Hook. The construction of these blockhouses was undertaken by a "very industrious and intelligent" local mechanic by the name of Cropsy, who resided in New Utrecht. These blockhouses were armed with wall pieces from West Point and manned by detachments from Gen. John Swarthout's brigade of New Jersey Militia based at Perth Amboy. In addition, Capt. Jacob Lewis, commanding the naval forces in the lower harbor, had gunboats and barges to patrol the waters inside Sandy Hook and to interdict the intercourse between spies in the city and Admiral Warren's flagship HMS *Ramilles*. By May 25, Swift had the temporary defenses reasonably well in hand for the protection of the city. In addition to the increased garrison in the Staten Island works, some 89 additional pieces of artillery were moved to the island.

The British blockade of the southern entrance intensified at the end of May 1813. Barges from the frigate HMS S*atira* frequently chased small vessels in the vicinity of Rockaway. The blockade of the southern entrance to New York Harbor was so strict by autumn 1813 that part of the 3rd US Infantry Regiment was sent down to reinforce the defenses on the Hook.(39)

Jonathan Williams' Fort on Hendricks Reef Is Commenced

After laying out his plans for Staten Island in the early 1800s, Colonel Williams turned his attention to shallow Hendricks Reef, only a scant two hundred yards from Long Island. As a result of his 1805 survey, in 1808 Williams' reiterated to the state legislature his suggestion for a battery there and in 1810 again recommended a castle similar to Castle Williams on Governors Island for the reef.

No action was taken until war with Great Britain came in June 1812. Finally, a diamond-shaped work was planned for Hendricks Reef. The construction on Hendricks Reef was delayed by Colonel Williams' resignation.(40)

Many in New York City considered the fortifications defending the harbor grossly inadequate. By June 25, the city Committee of Defense was requesting the federal government to begin construction of the long-considered battery on Hendricks Reef, as well as a covering work at Denyse's Heights on Long Island. Apparently, a blockhouse or small fort of earth and timbers was erected at the site of Montressor's 1778 lunette on Denyse's farm. This work was named Fort Lewis, most likely for Maj. Gen. Morgan Lewis of New York. In addition, other blockhouses at Long Island's west end were also proposed for Bath Beach, New Utrecht, Princess Bay, Jamaica Bay, and Rockaway.(41)

On March 15, 1813, Lt. William Cutbush, superintending construction of the works on Hendricks Reef and at Sandy Hook, reported to Secretary of War Armstrong that the troops and workers occupied far more space than was available for that purpose and requested authority to purchase additional tracts on Long Island to house the troops and laborers assigned to the Hendricks Reef project. Cutbush considered 60 acres of farmland owned by William Dinin and D. Dinin overpriced.(42)

While Commodore Lewis' gunboats and the considerable force of New York and New Jersey Militia, bolstered by a few regiments of regulars, guarded the lower reaches of New York Harbor, the armament at the Narrows was increased. The number of guns at Forts Richmond, Hudson, and Morton rose to 90. Atop a hill on Staten Island, some 400 yards southwest of Fort Tompkins and about 540 yards west of the Narrows, the State of New York leased a tract for a square earthen redoubt for four 18-pounders. Named Fort Smith, for Arthur Smith of the State Board of Fortifications, it was situated to prevent an enemy landing at Princess Bay and to occupy the hill that commanded unfinished Fort Tompkins. Although a barracks was built at the site, Fort Smith's armament was not immediately pro-

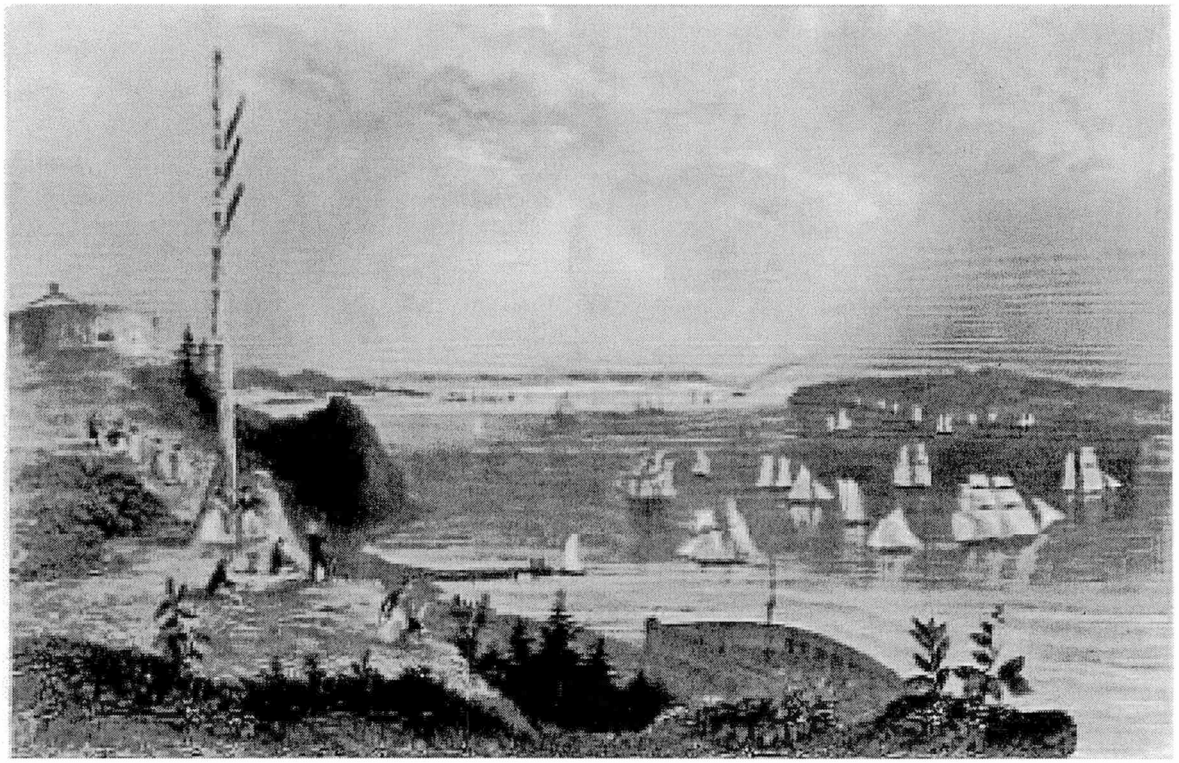
vided. Leased for the duration of the war, the legislature failed to allot funds to purchase it at the end of the war and the work was dismantled.(43)

Fort Tompkins was never completed during the war and remained unarmed. Its scarps and two circular bastions of sandstone, however, formed a strong redoubt that protected the rear approaches to the lower batteries that guarded the Narrows. Following the War of 1812, the Staten Island batteries were all but abandoned, falling into an advanced state of disrepair.

In August 1813, the 24th US Infantry Regiment and a regiment of New York Volunteers arrived to further strengthen the Staten Island defenses. Governor Tompkins obtained additional funds to complete Fort Richmond and advance the construction of Fort Tompkins. By 1815, the Staten Island batteries were armed with twenty-five 32-pounders, forty-four 24-pounders, four 18-pounders, seven 9-pounders, and more than 800 smaller artillery pieces.(44)

Major Bomford was still in Albany in late July when he received orders to apply to the state for title to the lands on Long Island that the government had selected for a work to cover the battery on Hendricks Reef.(45)

Chief Engineer Swift, like his predecessor, also served as superintendent of the Military Academy, and made regular trips to West Point to oversee the academy's operation. However, by the end of July 1813, he was seeking active service on the northern frontier. Finally, by August 9, Swift received orders to join the field army being assembled at Sacketts Harbor, NY. He departed August 17. After nearly three months in upstate New York, Swift returned to New York City on November 27 to resume his duties. On November 30, accompanied by General Dearborn, commanding the Department of New York, Gen. William Henry Harrison, and Secretary of War John Armstrong, Swift inspected the works on Staten and Long Islands, and observed the British squadron off Sandy Hook.(46)



The Narrows, ca 1850, with bastion of Fort Tompkins at far left background, semaphore pole and Fort Richmond in right foreground. *Author's Collection*

Samuel Babcock Advances the Battery on Hendricks Reef

In an October 1, 1812, report to the secretary of war, Captain Babcock noted that the sinking of blocks on Hendricks Reef was about one-third complete. On November 6, the legislature ceded the "parcel of land covered with water in the town of New Utrecht on the easterly side of the Narrows at the entrance of New York Bay under a reef commonly called Hendricks Reef containing thirty acres."(47)

On March 15, 1813, Lieutenant Cutbush wrote Secretary Armstrong regarding the work projected for the heights behind the battery on Hendricks Reef, noting that the site designated by Major Bomford was not large enough for the purposed work. Major work on the fort proposed for the hill at the west end of Long Island overlooking Hendricks Reef was suspended and in its stead an open battery was planned. Swift noted, however, that it would still be necessary to occupy the high ground in the rear of the covering battery with two stone towers, each armed with a 32-pounder and a 10-inch mortar.(48)



Maj. George Bomford. *Corps of Engineers*

By early December 1813, the foundation for the castle on Hendricks Reef was well advanced, the cofferdam around the site built, and the foundation blocks laid. A dock was built to land materials. The first floor of the channel faces of the work was also laid. The work was planned for two tiers of casemated guns with the possibility of a third tier being added. Were a third tier to be added, Cutbush questioned whether there would be sufficient space in the castle to accommodate the men required to garrison it. On the Long Island heights behind the work on Hendricks, the lightly armed stone infantry redoubt proposed in earlier plans was to be replaced by a covering battery for artillery.(49)

On February 14, 1814, Colonel Swift reported the progress on the casemated castle at Hendricks Reef to Secretary Armstrong, with a plan of the work as well as elevations and sections. A wharf had been built at the west end of Long Island to communicate with the casemated work on the reef.

On February 23, 1814, Colonel Swift was promoted to brevet brigadier general for meritorious service at the battle of Chryslers Farm, Upper Canada, on November 11, 1813. The City of New York purchased 60 acres, one rod, and six perches from Jaques Cortelyou Denyse at New Utrecht, at the west end of Long Island. On May 30, 1814, the "Mayor, Aldermen, and Commonality of the City of New York" ceded and granted this land to the federal government for fortification purposes in exchange for certain U.S. properties in the city.(50)

Secretary Armstrong, having received a new estimate on the cost of the castle at Hendricks Reef in February 1814, wrote Swift that he was much disturbed that the cost had continued to increase. Bomford's August 1812 estimate to construct a two-tier battery surmounted by an open barbette tier on the reef and covering works on Long Island, with a chain of logs across the Narrows and a covering work on Staten Island, had only come to $160,000. The sum of $100,000 had already been spent on the reef castle alone. Now the most recent estimate for the completion of the works on Hendricks was

set at $120,000 for a two-tier work and $181,000 if built to three tiers. Armstrong voiced his lack of "confidence in estimates," a concern that would be echoed by future secretaries of war and Congresses for another century regarding the nation's seacoast defenses. He then instructed Colonel Swift to erect the castle on Hendricks Reef in accordance with the least expensive two-tier plan. Strong works were also under construction on Brooklyn Heights east of Governors Island, and on the heights southwest of the navy yard.(51)

On the reef, once construction of the foundation had been sufficiently advanced, a temporary battery with three heavy guns was constructed of timbers on that part of the cofferdam's upper surface at the angle facing directly across the Narrows. No further fortification of the reef was undertaken until the end of the War of 1812. About one-third of the stone blocks that formed the sub-foundation of the battery had been sunk. Babcock expected the sub-foundation to settle and felt an additional two hundred boatloads of stone would be required to complete the foundation.(52)

On August 31, 1816, Swift sent his statement of expenses for engineering work done during August to William H. Crawford, who had succeeded General Armstrong as secretary of war. On Hendricks Reef, some $5,101.24 had been expended for stone, lime, and lumber. During September, Swift expected to spend $7,400 there.(53)

In May 1817, as a result of difficulties with Colonel Hindman, commanding Governor's Island, over supervision of troops improving and repairing the various forts on the island, Capt. Rene E. DeRussy shut down all engineering work in New York Harbor with the exception of the Hendricks Reef project and some work at Sandy Hook. The issue would not be resolved until late October.(54)

On October 12, 1818, General Swift reported in his annual report to Secretary of War John C. Calhoun that the only work still under construction in New York Harbor was the castle at Hendricks Reef. As projected in 1818, the work, now about half-complete, was to be for 96 guns and cost $275,000. Swift noted that if $110,000 were appropriated the work could be completed in 1819. Swift added that additional fortifications were required at Sandy Hook, at the Narrows on Staten Island, and on the heights above Hendricks Reef on the west end of Long Island. In addition, the chief engineer pointed out the importance of enhancing the lines on Brooklyn Heights. On November 30, 1819, Col. Walker K. Armistead, who had succeeded General Swift as chief engineer on November 12, 1818, was able to report to Acting Secretary of War Maj. Christopher Vanderventer, that the fort on Hendricks Reef was nearly finished.(55)



Col. Walker K. Armistead. *Corps of Engineers*

In a comprehensive report of its operations between 1818 and early 1821, the Board of Engineers noted that the object of defensive works on the Hudson and East Rivers was to cover the city of New York against attack by land or water, to protect its shipping, and prevent the blockade of the harbor as much as possible. As the forts projected for the Narrows and at Throgs Point on

the East River would force an enemy to land at a distance from the city, that would place the lines of fortification on Brooklyn Heights on Long Island and Harlem Heights on Manhattan Island on the interior curve of a frontier extending from Sandy Hook eastward and northward to the Hudson River.

The forts projected for the East Bank and Middle Ground would "complete the defense of the city, by depriving an enemy of the landing place in Gravesend Bay, the only spot on the south shore of Long Island where he can safely land to march on Brooklyn." These works would also prevent an enemy establishing himself on Staten Island, and prevent a hostile force from anchoring in the outer harbor and blockading the inner harbor. The board considered the works developed in the inner harbor to be "scarcely at all defended against a sea attack; and not at all defended against an attack on land."

The board believed that works of the first class were immediately required at the Narrows on Staten Island and at New Utrecht on Long Island. To guard the eastern approaches to the city, the Board also called for works at Throgs and Wilkins [Willets] Point on the East River. The works at the Narrows were estimated to cost $910,983, those on the East River $928,026. Once these works were in place, the overall plan called for constructing the projected works in the outer harbor on the Middle Ground and East Bank. These works would be exceedingly expensive - each was estimated to cost $1,681,411. (56)

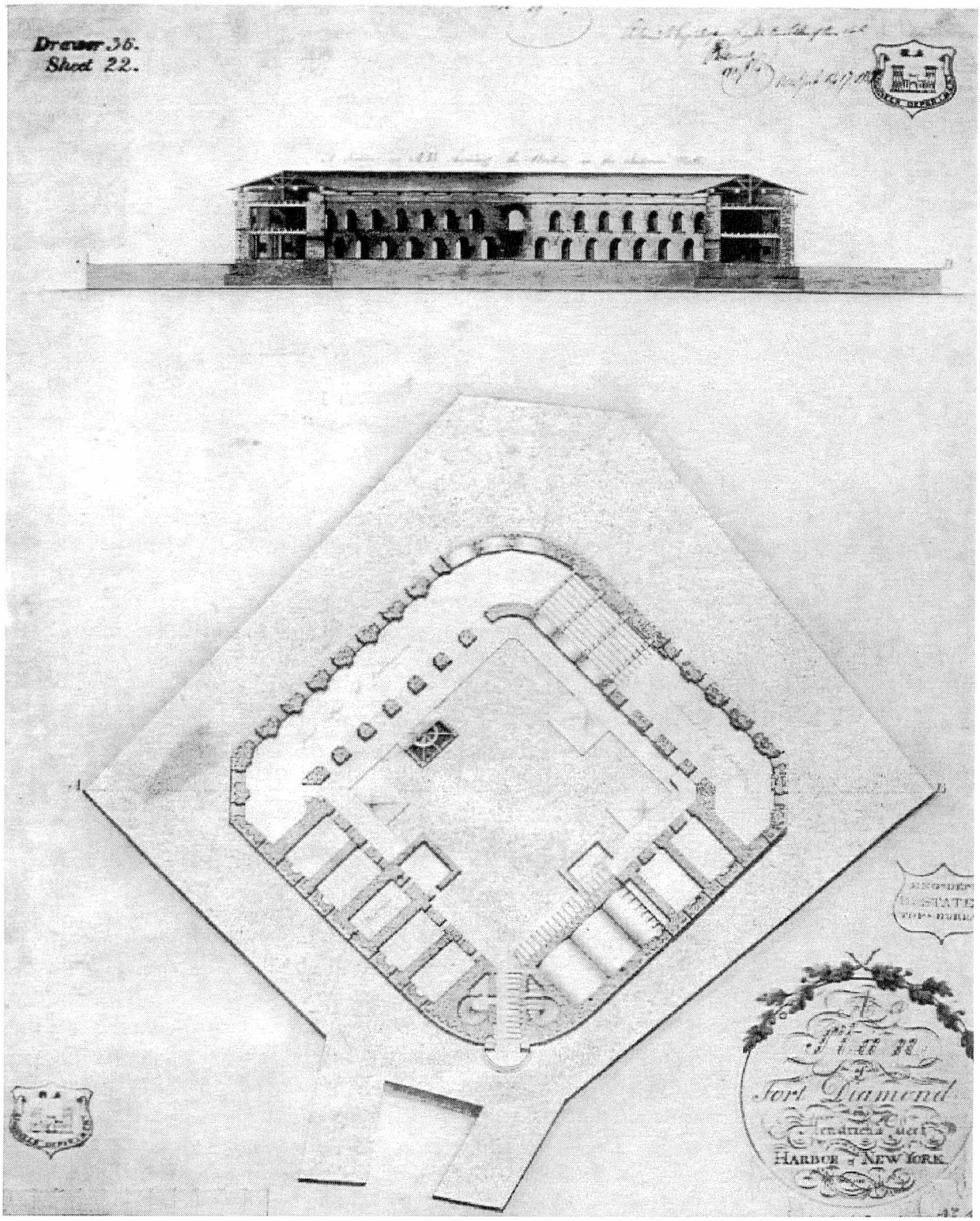
Fort Diamond, as the work on Hendricks Reef was initially named, ostensibly because of its shape, although occupied by a small garrison since 1820, was finally completed in 1822 after an expenditure of $318,305.89. The three-tier stone castle measured 214 yards around. The fort was provided with seventy-two 32-pounders. According one source, however, it may have been capable of receiving 93 guns if fully armed. This powerful battery on the Narrows was projected for a wartime garrison of 500 officers and men. Although in peacetime it was planned to accommodate a garrison of 80 men, in 1822 it was occupied by only 55 men.(57)

Founded on the stone foundation built on Hendricks Reef, Fort Diamond was a brick and Newark Red Sandstone quadrangular masonry work, with one of its principal faces directed down the Narrows and the other facing toward the city. The work was three tiers high and its two landward faces contained quarters for the garrison as well as additional armament. The sallyport was in the angle of the two land fronts. A wharf and landing were adjacent to the sallyport. The three tiers of the fort were floored with heavy timbers supported by oak trusses. The initial armament was on the lower and middle tiers. Magazines in the interior of the fort housed the gunpowder. The upper tier was provided with a shingled wooden shed-type roof that quickly weathered. Cisterns beneath the casemates stored water for the garrison.

Beyond the completion of Fort Diamond, little tangible progress was made in New York's seacoast defenses. However, by November 1822, plans and estimates were being developed to replace the state works on Staten Island with new ones built by the federal government. A new Fort Tompkins estimated at $420,826.14 was to replace the old sandstone fort built during the War of 1812. In advance of the new fort, a redoubt costing $65,162.44 was to be built to protect the land approaches to the fort. Across the Narrows on Long Island, a new fort at New Utrecht overlooking Fort Diamond was projected to cost $371,970.60. Beyond this fort, a redoubt costing an additional $53,024.72 was planned for the heights commanding the land approaches to the new fort.(58)

In March 1823, during the visit of the Marquis de Lafayette to the United States, President James Monroe directed Fort Diamond renamed "Fort La'Fayette" in commemoration of the marquis' distinguished service as a major general in the Continental Army during the Revolutionary War. Secretary of War Calhoun noted in a November 29, 1823, letter to the President that the fort at New Utrecht to cover Fort Lafayette could be commenced during 1824 if appropriations were granted by Congress.

(59)



Elevation and plan of Fort Diamond (Fort Lafayette), ca 1822. *NARA*

Fort Hamilton Built on Long Island

While the various surveys conducted by United States and the State of New York in the 1790s and early 1800s had pointed out the significance of the Narrows, it was not until after the War of 1812 that specific plans for the projected fort at New Utrecht Point were finalized and implemented. On November 29, 1823, Secretary of War Calhoun advised President James Monroe to request appropriations from Congress to commence a work at New Utrecht to cover Fort Lafayette. Once title and jurisdiction to the land had been secured, $50,000 was appropriated to collect material for the fort's construction. On April 25, 1824, Lt. Andrew Talcott of the Engineers was ordered to New Utrecht to conduct surveys and prepare the wharf for the construction materials.(60)

The site selected for the new fort was on the southwest shore of Long Island, where it curves to the west along the left (east) bank of the Narrows. The work was to be in the village of New Utrecht, about six miles below Manhattan's Battery. From here the fort would command the channel through the Narrows, with a "fine view of not only the Narrows, but a portion of the inner bay and in a southerly direction across the outer bay, the highland[s] of New Jersey are visible by day and the lighthouses of Sandy Hook by night. Nothing separates Fort Hamilton from the Atlantic but a narrow strip of sand called 'Coney Island.'" On the landward side of the proposed fort, the topography was rolling, with a series of hills and depressions that would ultimately require advanced fortifications to secure the land approaches.(61)

It is believed that Maj. and Bvt. Lt. Col. Joseph G. Totten, member of the Board of Fortification and early proponent of the polygonal or German School of Fortification, was instrumental in planning this one of the few polygonal early Third System forts. The plans for the fort were approved August 25, 1824. In his report to the secretary of war in November 1824, Maj. Gen. Alexander Macomb, who had succeeded Armistead as chief engineer of the army, reported that the fort at New Utrecht had been begun, although the only work accomplished was the collection of material and erection of the construction plant. Although the greater part of the site some 55 feet above the Narrows was already owned by the United States, $50,000 had been appropriated to purchase additional tracts and for the collection of construction material. During the work season, the wharf had been repaired and a railway built and extended from the wharf to the construction site some 45 feet above. When the owner of the required tracts at New Utrecht asked an inflated price, the good offices of the City and State of New York were enlisted by the engineers to achieve an equitable solution.(62)

Ground at the fort was broken and work commenced April 26, 1825, under Capt. George Blaney of the engineers, with Lt. Joseph K.F. Mansfield in immediate charge of the project. On June 11, 1825, the cornerstone was laid for the fort, named in honor of Maj. Gen. Alexander Hamilton, an artillery officer from New York and aide-de-camp to General Washington during the Revolution, and later the nation's first secretary of the treasury before being killed by Aaron Burr in a duel in 1804. Land acquisition at New Utrecht dragged on as the remaining parcel required had still not been acquired by the government. This second parcel of some 16½ acres was acquired through condemnation and finally ceded to the federal government by the New York Legislature on November 27, 1824. A resurvey of this second parcel, however, resulted in the discovery that a purchase of still more land would be necessary. An additional "seventeen acres, fourteen perches, and one hundred and five yards of land" were obtained through condemnation and duly ceded to the United States government by the legislature on April 17, 1826. During FY 1824-1825, a substantial seawall was built and foundations for about half the enceinte and its counterscarp, exclusive of the gorge and a caponnier in the ditch, had been laid. The scarp was also raised several feet on one side of the work.(63)

The additional land for Fort Hamilton was finally acquired in 1826, but not until late in the work season. Consequently, the only substantial construction on the fort was on the portion of the tract already in government hands.

The pace of construction increased at New Utrecht Point during the work season of 1827, according to General Macomb, who visited the site in September. He found the fort about half complete. By the end of the month, $207,690.51 had been expended on the work.(64)

While the allotment of funds for Fort Hamilton in 1828 was less than anticipated by Major DeRussy, the new superintending engineer at New Utrecht, considerable progress was made. More than 32,000 cubic yards of earth were excavated and placed in proper locations; 3,233 cubic yards of stone were laid, and another 2,193 cubic yards of brick were used to build the arches of the casemates and piers. In addition, some 36,013 feet of freestone was cut and dressed.(65)



Joseph K.F. Mansfield in latter life. *Author's Collection*

Progress on the fort in 1829 was such that Col. Charles Gratiot, who had succeeded General Macomb as chief engineer in 1828, believed it likely the work could be finished during 1830. The workmanship was considered exceptional, as were the materials used. It was discovered in 1828 that some repairs were required at Fort Lafayette. There was, however, difficulty obtaining sufficient workmen because of the "unhealthiness of the situation during the summer which deters workmen who can find advantageous employment elsewhere." This disadvantage not withstanding, much was accomplished and the repairs were slated for completion during the winter of 1829/1830 and the following spring. (66)

The cost of materials used in constructing Fort Hamilton between 1828 and 1829 was only slightly higher than the cost at Fort Adams in Newport, RI: (67)

	1828	1829	1830
Stone, per perch	$2.74	$2.43	$2.46
Bricks, per thousand	$7.33	$7.35	$7.21
Hydraulic cement, per cask	$2.74	$2.40	$2.46
Lime, per cask	$1.22	$1.08	$1.02
Scantling pine, per thousand feet	....	$14.53	$22.48
Timber, oak, per cubic foot	$0.12	$0.16	$0.12
Masons' wages, per day	$1.62	$1.40	$1.47
Carpenter's wages, per day	$1.76	$1.76	$1.52
Smith's wages, per day	$1.45	$1.48	$1.49
Laborer's wages, per day	$0.95	$0.94	$0.94

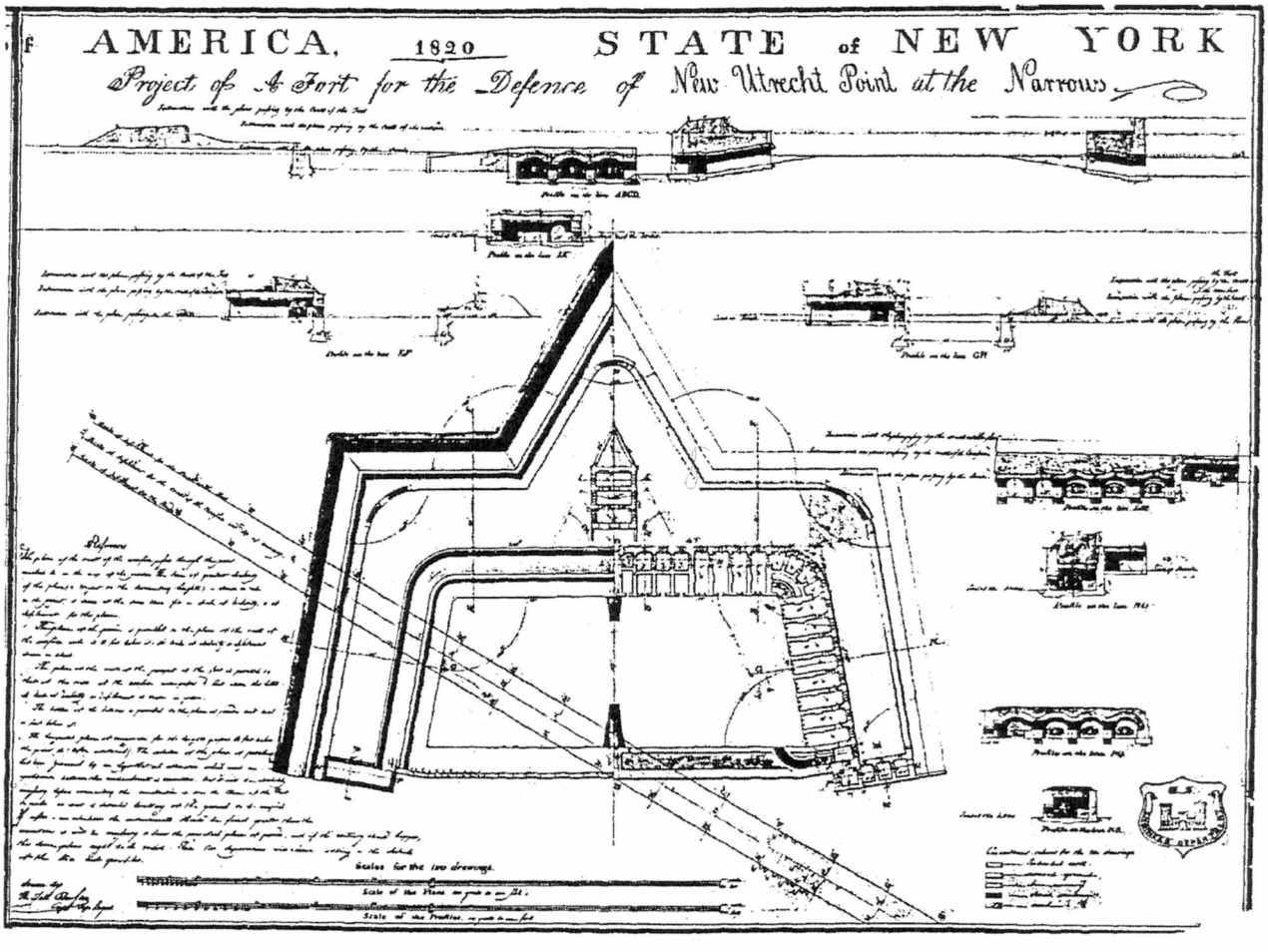
The chief engineer noted in his 1830 annual report that Fort Hamilton would be finished in a few months and repairs had been completed at Fort Lafayette. Typically, by the early 1830s there were upwards of 220 persons employed at Fort Hamilton. In addition to two engineer officers and four overseers, there were 59 mechanics, and 159 laborers and boatmen.(68)

Additions to the project at Fort Hamilton were completed by the end of November 1832. These included drains for the casemate roofs and traverse circles for the gun platforms. Any unexpended funds were to be retained to deal with defects that became apparent after the fort was declared finished. In addition to his duties at New Utrecht, Major DeRussy also supervised repairs to the work on Governors Island.

Capt. John Lind Smith, the engineer in charge at Fort Macon, Beaufort, NC, and Fort Caswell at the mouth of the Cape Fear River in that same state, was ordered to New York in 1832 to supervise engineer activities in New York Harbor, succeeding Major DeRussy, who was transferred to West Point.

Fort Hamilton's first garrison, two officers and 52 enlisted men of Company F, 4th Artillery, commanded by Capt. Levi Whiting, arrived from Fort Columbus on November 1, 1831. Fort Hamilton appears to have been a sub-post of Fort Columbus until 1847. At the end of November 1833, New York Harbor was still garrisoned by the 4th Artillery, and Bvt. Maj. and Capt. Benjamin Patrick Pierce with two companies, four officers and 94 men, manned Forts Hamilton and Lafayette.(69)

As finish work at Fort Hamilton continued in 1834, failure of the masonry bond used to construct the seawall at Fort Lafayette and uneven settling of the wall were discovered in many places. The small amount of money remaining in the account for Fort Hamilton was spent dealing with these structural failures at Fort Lafayette and with some slight defects at Fort Hamilton that were repaired.(70)



Plan and sections of the fort at New Utrecht, Long Island, later named Fort Hamilton. *NARA*

Upon completion, the fort was described as follows: (71)

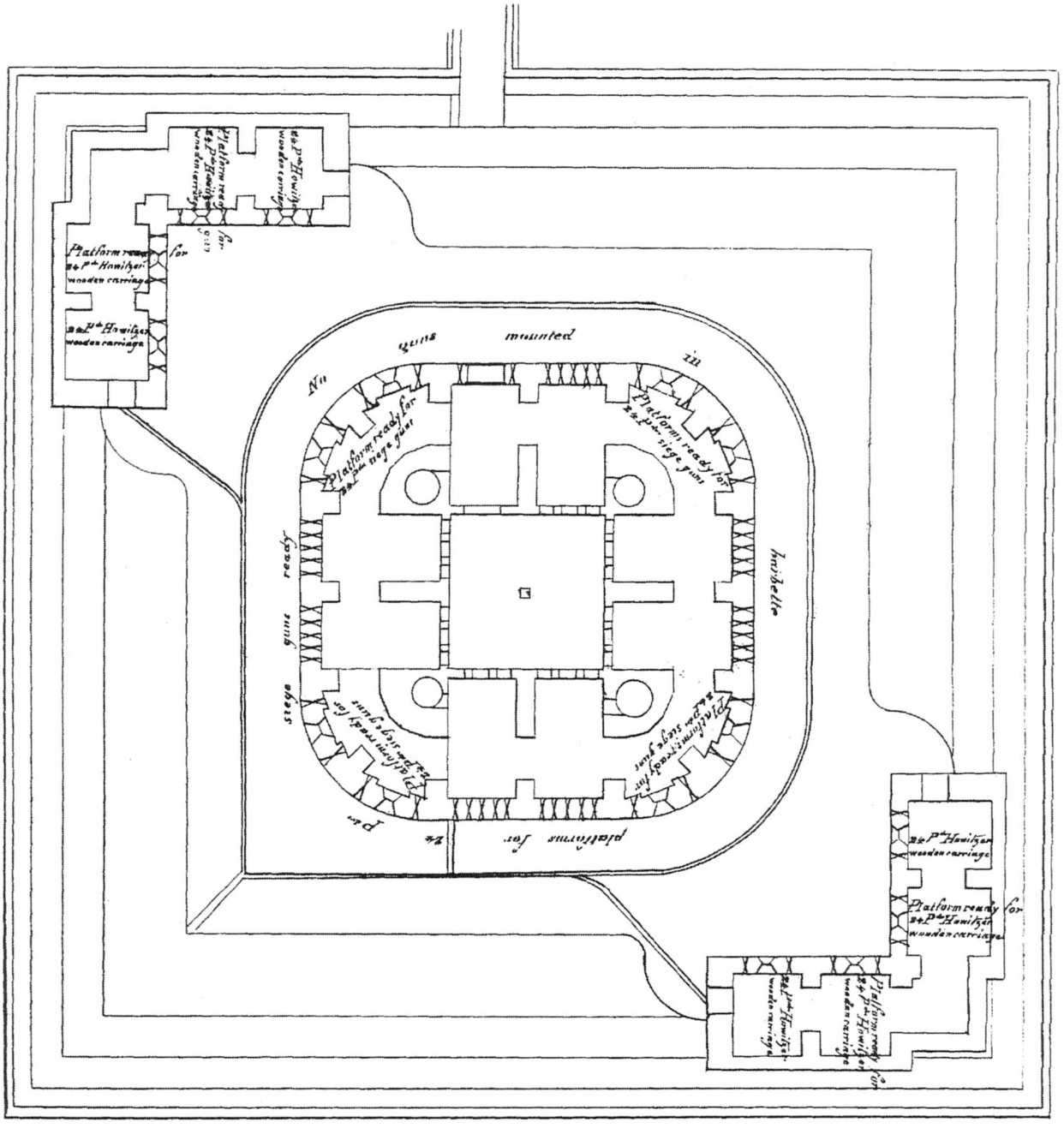
> The fort is built of gray granite with a trace or outline after the German system; and is quadrangular in form. An escarp or granite wall protects the casements [sic], guns firing through embrasures or ports, and is surrounded by a parapet or earthen bank. This parapet serves as a shield for the barbette defense or guns mounted on the ramparts on top of the casements [sic]. The entire work is surrounded by a dry ditch. On top of the counter scarp or outer wall of the ditch is a covered way or earth rampart several feet below the level of the glacis or natural slope leading away from the fort. Its purpose is to serve as a protected place for the organization of a sortie or counterattack in time of siege. In the center of the eastern or principal land front there is a caponniere or V shaped structure for the resistance of attack. This flank defense, although entirely separate from the main fort, is within the protecting line of the ditch and covered way.

The sallyport was in the channel face of the work, facing the Narrows, with a semicircular segmental-arched *voussoiur* bounded on each side by a pair of elegant neo-classical demi-columns or pilasters supporting an architrave and pediment. The channel front contained 14 casemates on each side of the sallyport, each having a brick embrasure. The outworks of Fort Hamilton consisted of the dry ditch and *cunette*, a covered way, and a glacis on the land faces conforming generally to the trace of the enceinte. A semi-detached caponnier occupied the dry ditch at the middle of the north, or principal land front. This caponnier, accessed from the enceinte, was fitted out with platforms for six carronades or 24-pounder flank howitzers mounted *en casemate* to sweep the ditch on the north side of the enceinte. The ditch was enclosed at its south, or Narrows ends by caponniers, each containing three reverse-fire casemates covering the ditch in each flank. A fourth reverse-fire casemate on each of these caponniers covered the channel front of the enceinte. These caponniers extended beyond the channel front, forming a kind of "demi-bastion" at each end of Fort Hamilton's channel front. Access to the ditch was from outside the fort at the juncture of the east front and the south or channel front. A postern in the fort's north front opposite the caponnier also afforded access to the enceinte.

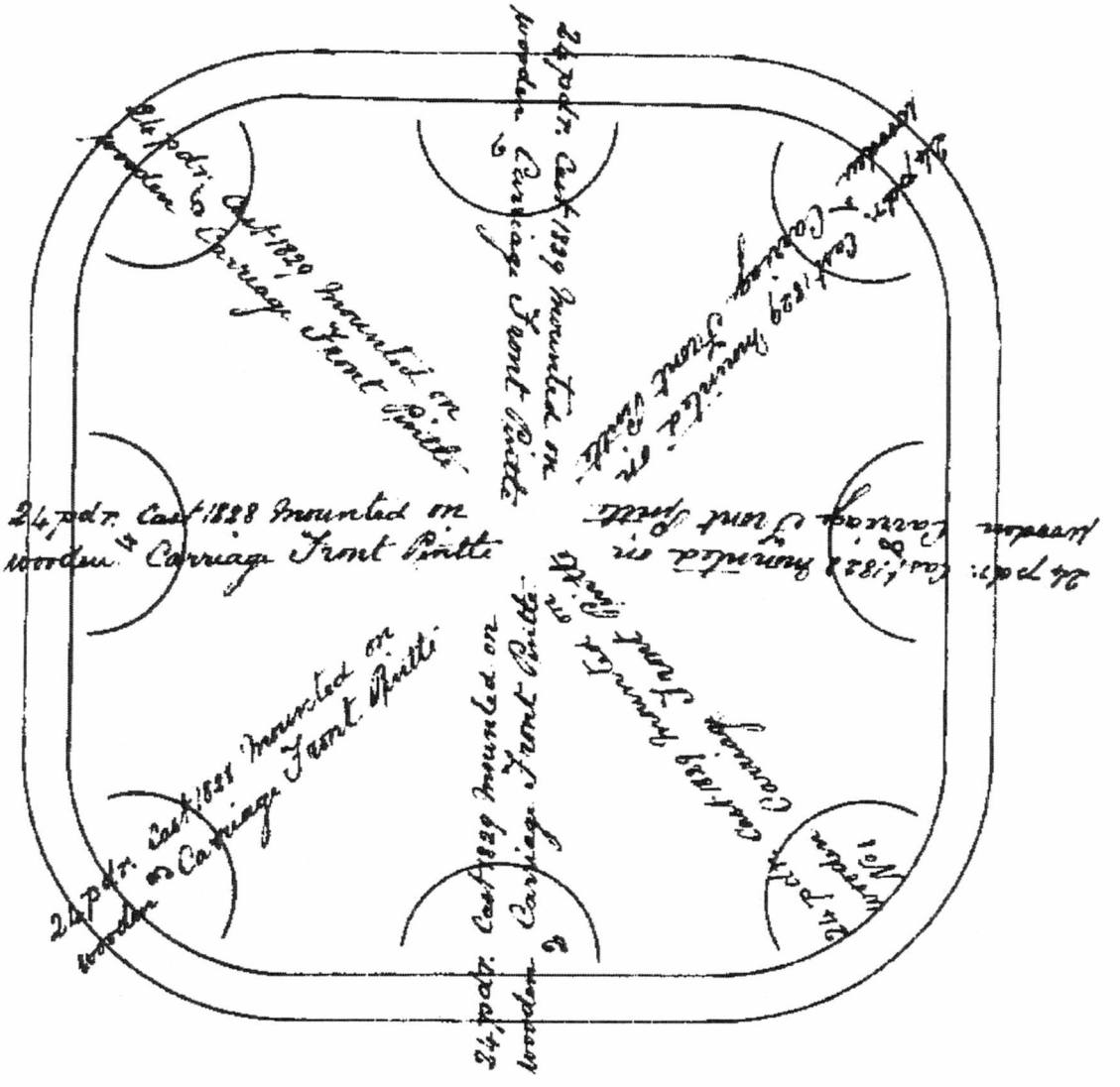
The four curtains of the polygon forming Fort Hamilton's enceinte were casemated. The west curtain casemates served as officers quarters and mess room. The enlisted men were housed in the east flank and south curtain casemates. Engineer, ordnance, quartermaster, and artillery storerooms, a hospital, three casemates fitted out as prison cells, two guardrooms, two magazines, and a postern occupied the north front of the enceinte. The caponnier in the ditch of the north front contained a bake oven. A shot furnace was on the parade ground adjacent to the east flank curtain. Paved walkways abutted the parade wall on all four sides of the enceinte.(72)

In addition to the main work of Fort Hamilton, an advanced redoubt was built on the heights northeast of the enceinte, with a dry ditch, covered way, counterscarp, and glacis. The square redoubt was constructed of brick and granite. Each face was 108 feet along the cordon. The work consisted of a casemated tier surmounted by a barbette tier with a four-foot-thick stone parapet. The armament was composed of 24-pounders, of which eight were mounted *en barbette* on front-pintle wooden carriages on the terreplein behind the parapet. The four curved salient angles of the redoubt were arranged for eight 24-pounder siege guns *en casemate* on wooden front-pintle carriages. The four curtains were each pierced with 10 loopholes or rifle ports. The counterscarp, with reverse-fire casemates in opposing angles, sustained a glacis. Each casemate was arranged for a 24-pounder flank howitzer on a wooden front-pintle carriage and a loophole flanking each embrasure. Engineer 1st Lt. James St. Clair Morton was unimpressed with the Fort Hamilton Redoubt, which he considered "insignificant in size." He noted in 1858 that its guns took up "about half the room on its contracted terreplein, leaving space for

perhaps thirty or forty men, in two ranks, to fire in either direction. Its parapets are but four feet thick, and are of masonry, which a short cannonade would knock down, leaving the terreplein open to a rifle fire, which would soon clear it of its defenders."(73)



Interior of Fort Hamilton Redoubt showing arrangement of casemates and reverse fire casemates in the counterscarp. *NARA*



Arrangement of 24-pounder armament on barbette tier of Fort Hamilton Redoubt. *NARA*



Fort Hamilton Redoubt with glacis, reverse fire casemates, and counterslope. *NARA*

Although completed and provided with a peacetime garrison, Fort Hamilton still lacked about half of its armament. The fort's projected armament was fourteen 32-pounders for the casemates overlooking the Narrows. On its barbette tier, another forty-eight 32-pounders were to be mounted on front-pintle barbette platforms, most bearing on the Narrows as well. The traverse of these guns were somewhat restricted, however, as the guns fired through embrasures. In addition, Fort Hamilton was to be provided with six heavy and six light 10-inch mortars. Fort Lafayette was to be armed with forty-seven 32-pounders and two heavy 10-inch mortars. In time of war, the garrison was to be increased to about 200 officers and men and the armament to about 130 guns and mortars.(74)

By the end of November 1836, the 4th Artillery had been replaced by a company of the 3rd Artillery, about 55 men commanded by Capt. David H. Vinton, who also commanded Fort Lafayette. This assignment was short lived, as the troops were ordered, with most of the Regular Army, to Florida during the Second Seminole War.(75)

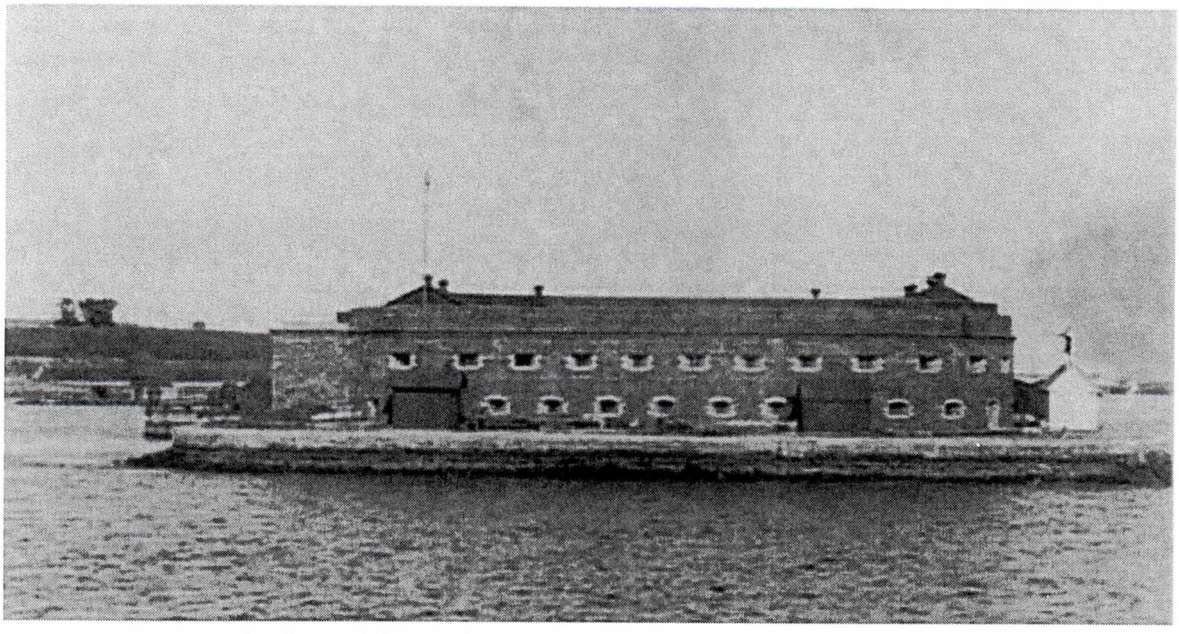
By the mid 1830s, even though its forts had not been provided with their full allotment of 503 guns and mortars, New York Harbor's eight forts and batteries made it the nation's most heavily armed seaport, the first line of defense at the Narrows was the most heavily armed element of the defenses.

Improvements at Forts Hamilton and Lafayette, 1839-1861

In the spring of 1841, 2nd Lt. Robert E. Lee of the Corps of Engineers arrived from North Carolina in the midst of a late-winter storm. Colonel Totten promptly assigned the lieutenant to duties at the Narrows. He was to modify Fort Hamilton's parapet for barbette-mounted guns. He was also to make extensive repairs to Fort Lafayette. The garrisons having been withdrawn, Lee was able to carry out the various repairs unhindered by their presence. Plans were made to replace Fort Hamilton's rotted wooden drains along the water front of the fort with "substantial masonry" re-laid in hydraulic cement. Leaks had been found in the casemate arches of the fort and their repair was considered indispensable. The Board of Engineers considered this a proper time to alter the terreplein battery for the new barbette seacoast gun carriages by converting the embrasured parapet to barbette. The two lower tiers of Fort Lafayette were considered efficient, but the shed roof of the upper battery was considered a fire hazard and unsuited for the uppermost tier armament. Consequently, the upper tier being adapted for the new seacoast carriage, the terreplein was to be rearranged to shed rainwater. Fort Hamilton's leaking casemate arches were repaired and the original embrasured parapet along the water front was replaced by a barbette battery in 1840 and 1841, while the terreplein was regraded and paved with brick and the platforms for the guns built except for the iron traverse rails. Although the barbette tier remained unarmed, the lower casemated tier was armed and a company of artillery arrived to take charge of the fort.

The work at Fort Lafayette focused on replacing the wooden planking of the upper and middle-tier floors with Kyanized timbers and replacing the wooden lower-tier flooring with brick laid in cement, installing stone gun platforms and iron traverse circle irons, and preparing the upper tier for its armament. Before this work could be completed, the funds allotted were exhausted. Like Fort Hamilton, Fort Lafayette now quartered a company of artillery.(76)

As repairs and modifications were planned for Fort Hamilton, it was still far short of its authorized armament. In 1840, it was actually armed with only fourteen 42-pounders, eighteen 32-pounders, eight 8-inch seacoast howitzers, six field pieces, two 13-inch seacoast mortars, four 10-inch siege mortars, and one stone mortar.

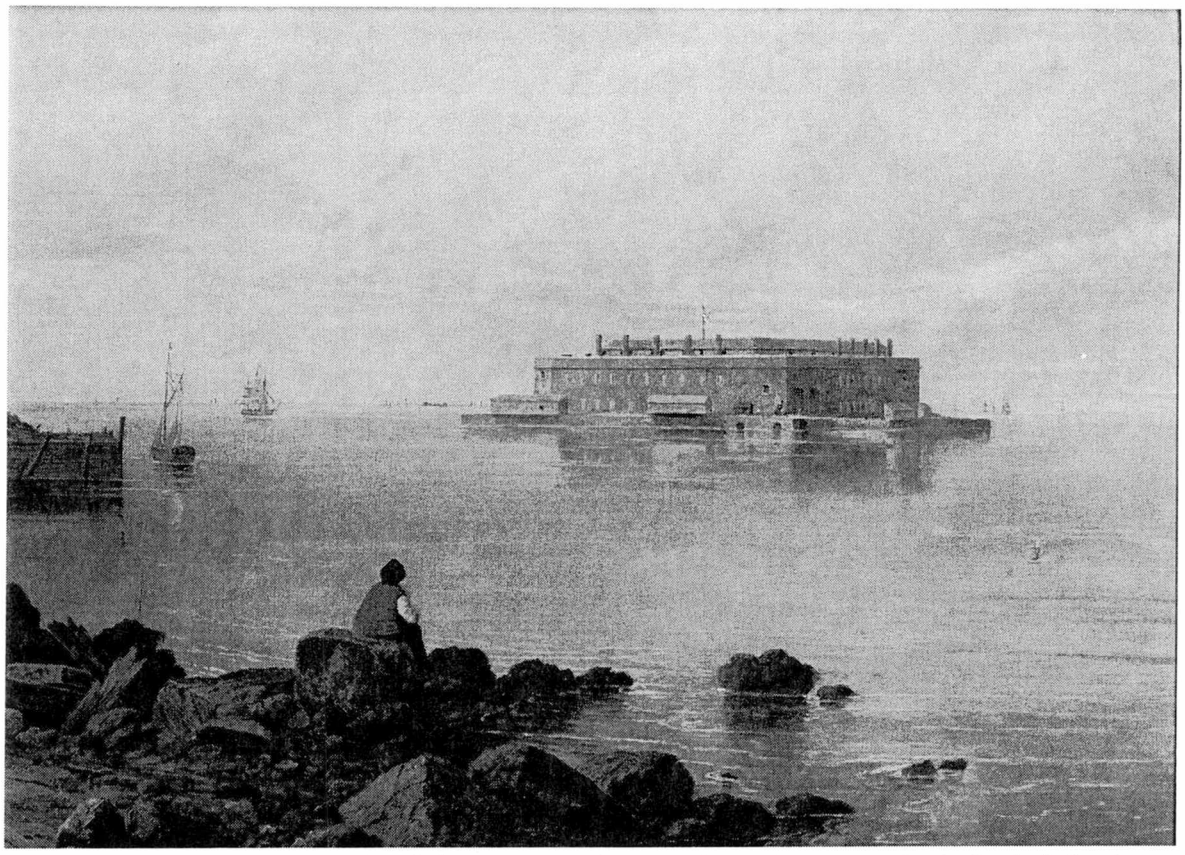


Right channel front of Fort Lafayette, ca 1902. *Author's collection*

Repairs to Forts Hamilton and Lafayette continued in 1842. The flooring of Fort Hamilton's casemated tier was broken up and replaced with hard paving bricks. The old wooden gun platforms were replaced with stone. The brick walls on either side of the west sallyport were replaced with iron gates to improve the ventilation of the casemated battery and allow free communication between the two branches of the curtain on either side of the sally port. On the barbette tier, the half embrasures of the parapet were filled in and the parapet was raised as required for the new barbette carriages. Leaks in the casemates were repaired and drainage improved. The earthen slopes of the covered way between the fort and the redoubt were regraded to a gentler slope and resodded. The armament was then remounted and placed in "perfect order."(77)

With the repairs to Fort Hamilton complete, at least for the present, the engineering efforts in 1843 centered on the advanced redoubt. The casemate woodwork of the advanced redoubt also required renewal. Additionally, its parapet was considered too low. The decayed wooden floors and linings of the casemates were removed and the rooms paved with brick on a bed of concrete. Granite gun platforms and iron traverse rails were provided for the 24-pounder flank howitzers. Doors and windows were Kyanized and repaired. The magazines were thoroughly ventilated and given new timber floors and ceilings of Kyanized wood. Leaks in the casemates were repaired and drainage improved. The earthen slopes of the covered way between the fort and the redoubt were regraded to a gentler slope and resodded.

At Fort Lafayette, the girders of the two wooden upper floors were strengthened and wooden gun platforms for 26 guns were laid on the uppermost tier. The woodwork was painted, along with other minor repairs. The middle and lower-tier batteries were armed and ready for service and the guns of the upper tier were in position but without carriages. The parapet wall was raised an additional two feet, and the masonry was repointed with cement and asphalt, while the wharf and seawall were repaired. This placed the fort in very good condition, requiring only painting the new woodwork to complete the repairs to the powerful battery. Plans for modifying the magazines at a future date were prepared. (78)



Fort Lafayette from the Long Island shore. *Print of painting by Seth Eastman in Author's Collection*

Repairs and alterations to the Long Island forts continued into 1845. Leaking casemates continued to plague Fort Hamilton. Finally, it became necessary to rebuild the scarp of the southeast front. Repairs were made to the officers' quarters in the fort, and the casemates quartering the enlisted men were placed in good condition as far as health, comfort, and accommodation were concerned. A postern was cut into the ditch from the gallery of the north flank caponnier, closed with double oaken doors. On the exterior of the sallyport, the original wooden ramp was replaced with stone. To improve the security, the flank caponniers were modified, a postern was cut into the ditch from the gallery on the south front of the fort, and the gorge of the covered way was closed with palisades. A ditch was excavated through the covered way at the south extremity of the south caponniers in front of the east sallyport.

The superintending engineer also recommended remodeling the casemates on the east front and rebuilding the piazza in front of the casemates. Both caponniers of the west or water front also required reconstruction. This work was continued into 1846 and brought to near completion by November. Additionally, the eastern sallyport opposite the caponniers in the east ditch was also thoroughly repaired and general repairs were made to the scarp, where inferior brick was replaced by "brick of the best quality." Fort Lafayette's upper-tier battery was partially armed when a portion of the gun carriages were provided. Magazine improvements were deferred because the removal of their munitions was not deemed prudent during the war with Mexico.(79)

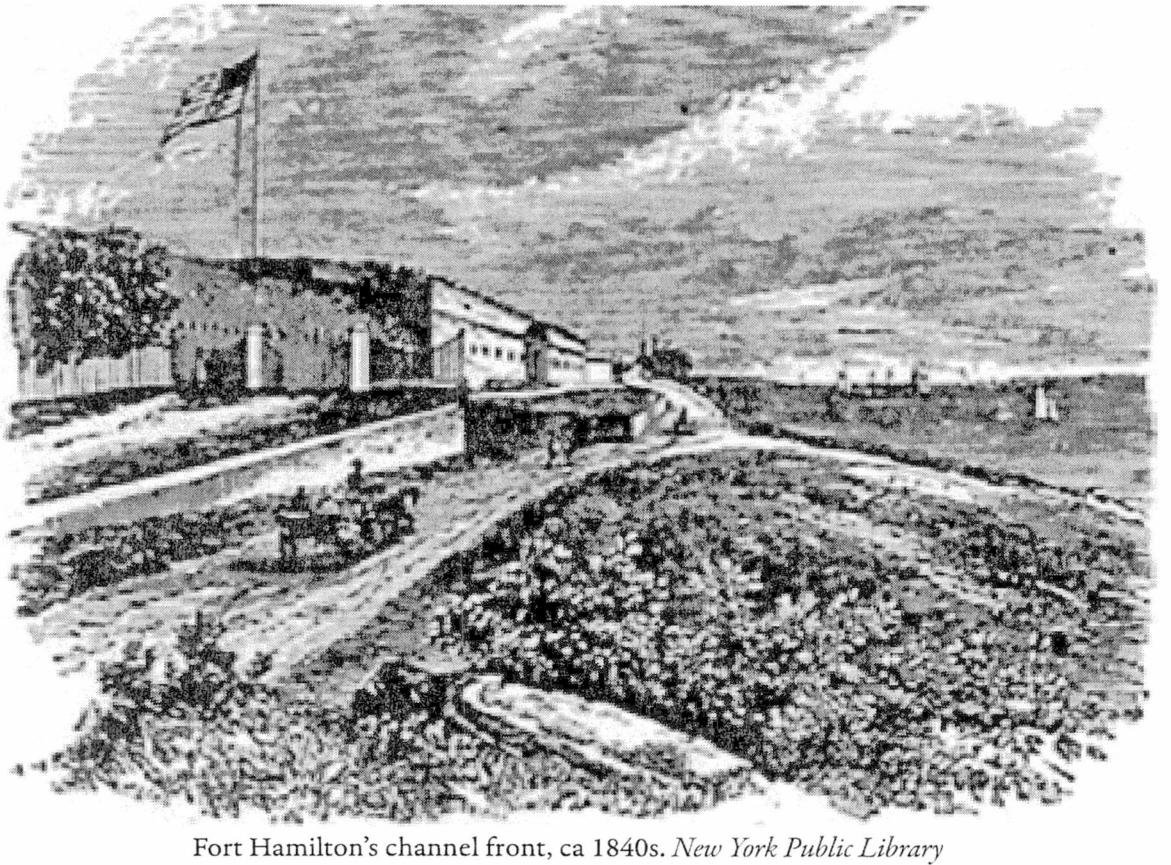
By the end of 1846, $1,034,570.95 had been expended on construction and repairs to Fort Hamilton and an additional $652,568.82 on Fort Lafayette. The costs would continue to rise over the following decades with still more repairs and improvements at the Long Island forts.(80)

Before engineering operations at Fort Hamilton were suspended during the war, an esplanade wall was constructed on the water front, drainage was improved on the western front, casemates of the southern caponniers were paved, and copper roofs were installed on three shot furnaces. Meanwhile, the post became a station for New York Volunteers and training installation for Regular Army recruits.(81)

When repairs resumed following the war, attention again focused on the perennial problem of leaking casemates. To alleviate the water filtering down through the parapet and terreplein and through the casemate arches, asphaltic mastic was applied over the exterior arches and beneath the superior slopes of the parapet and terrepleins. Drainage improvements were also completed and the galleries on the north, east, and south interior faces of the rampart were complete. Updated pintles and traverse circles were installed on the land fronts.



Lt. Robert E. Lee. *Corps of Engineers*



Fort Hamilton's channel front, ca 1840s. *New York Public Library*

After years of exposure to frost and heavy seas, the seawall at Fort Lafayette required extensive repairs. The mortar joints all required renewal, as well as the seawall copings, in addition to those of the fort's scarp. Work on the seawall commenced in May 1848 and was finished in September. Large numbers of decayed brick were cut out and replaced with new brick and the exterior masonry surfaces were "saturated with three coats of boiled linseed oil and then painted with three coats of best mineral paint" to preserve the brick from further injury.(82)

During the Mexican War, Fort Hamilton had been garrisoned by various organizations. The New York Volunteers were joined by volunteers from Massachusetts and even some so-called California Volunteers. These units were forwarded to the seat of the war and replaced by elements of the U.S. Marine Corps. With the end of the war, the Regular Army returned to Fort Hamilton. The 2nd Infantry under Lt. Col. Bennet Riley returned from Mexico and took up station at the fort until November 9, 1848, when three companies left for California. Riley's command was succeeded by elements of the 1st and 2nd Artillery that occupied the fort until December 1851. The 2nd Artillery continued to serve in the New York forts until April 1861.(83)

With the repairs to Fort Hamilton well in hand, the engineers turned to completing the mounting of armament on the land fronts. There, platforms and traverse circles for 12 guns, mostly 24 and 32-pounders, were built in 1849 and 1850. Improving the habitability of the casemates continued, and an iron-roofed piazza was built. A cunette was excavated in the ditch and a drain was laid to it from the parade ground. The replacement of the earthen parapet continued, and another 100 feet were embanked and sodded. Eight platforms and traverse circles for 24-pounders were also built on the barbette tier of the redoubt. Down on Hendricks Reef, two new shot furnaces were erected at Fort Lafayette and a masonry wall to protect the entries to two magazines was built in 1850.(84)

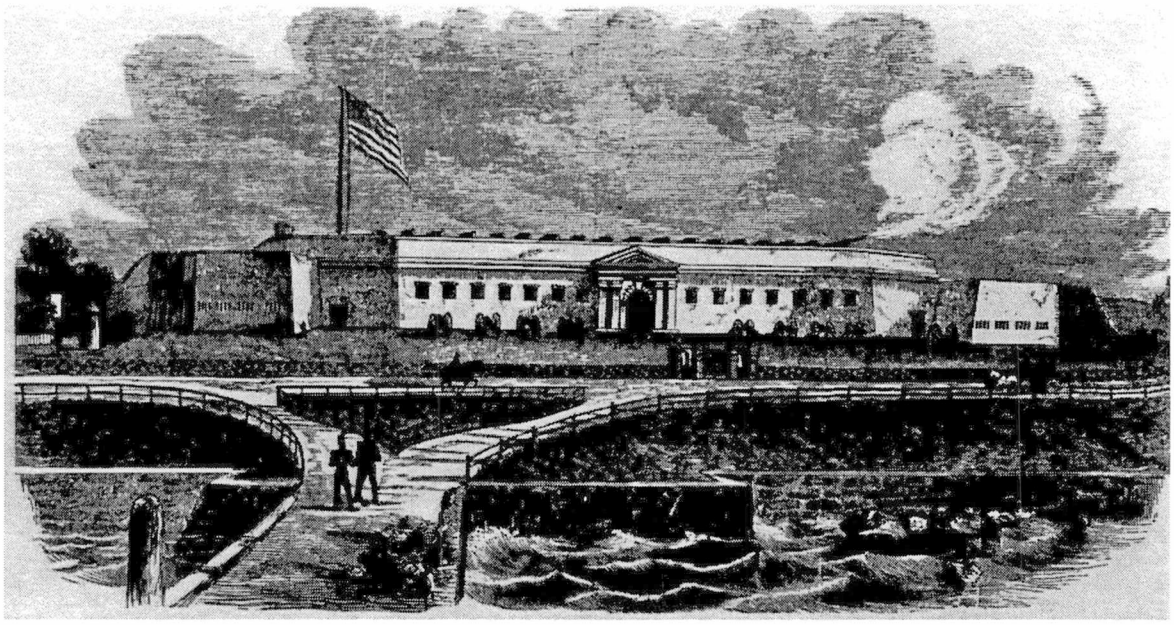
In the early 1850s, the remodeling of Fort Hamilton continued. The main ditch was graded and its cunette formed. The walks in front of the quarters and magazines and of the north and south caponniers and their passages were flagged completed and the magazines bombproofed. The piazza around the three land fronts was finished and several more casemates were fitted out as quarters, while others were refitted as hospital rooms. Two cisterns were constructed on the terreplein.

At Fort Lafayette, the four cisterns were repaired and two magazines were paved with flagstones. The wooden roof over the upper tier continued to be set alight by cinders from the fireplaces and the roof of the piazza required renewal. An act of Congress approved February 14, 1851, altered the boundaries of the Fort Hamilton reservation. Eleven acres, 3 rods and 24 perches near the northwest edge of the reservation was exchanged for an equal area of land closer to the fort owned by George and Marie Antoinette Gelston of New Utrecht.(85)

Capt. George Dutton was superintending engineer in New York Harbor from April 1854 until September 30, 1856, when he was relieved by Bvt. Maj. John G. Barnard as pressure continued to mount to further improve the defenses of New York Harbor. Work finally commenced on a new and permanent wharf at Fort Hamilton in 1857, and by the end of the work season most of the piers had been set. This project was almost complete on June 30, 1858, requiring only a small amount of floor paving and a little stone coping. While Fort Hamilton was prepared for its full armament, the barbette gun platforms required modification to receive the new seacoast carriages. The casemates again leaked, requiring repairs to the roofs and covering the casemate arches.

At Fort Lafayette, Major Barnard examined the barbette tier and its wooden roof, concluding it would not be necessary to expend funds to place the roof in good repair, nor would it be worth the expense to adapt the upper tier for the new model columbiads. Consequently, only a small permanent wharf was constructed to replace the old one that had become unfit.(86)

By the late 1850s, the Board of Engineers had considered increasing the armament on the Long Island side of the Narrows. Fort Hamilton could only bring to bear a mere 44 guns on the channel and this was considered inadequate to bar an enemy fleet. Further, Gravesend Bay was uncovered and entirely open to landing parties. The acting chief of engineers, Lt. Col. Rene DeRussy, strongly recommended $150,000 to secure the necessary land and construct batteries along the bluff east of Fort Hamilton. Major Barnard reiterated his concerns regarding the vulnerable state of Fort Lafayette in 1859. While the fort occupied one of the most important positions in the harbor, the wooden floors of the middle and upper tiers were highly susceptible to being set afire by explosive shells, or the "carelessness of a match," which would render the work useless when needed the most. An estimated $120,000 was needed to place its casemated guns under adequate bombproof shelter.(87)



Fort Hamilton from wharf after renovations in the 1850s. *Author's Collection*

Old Works Repaired and New Works Constructed on Staten Island

Following the War of 1812, the old works erected by the state during the war had been seriously neglected. At Fort Richmond, the gun carriages had decayed and 32 and 24-pounder guns had sunk into the equally rotten timber casemate floors. If fully armed, the Staten Island forts would have boasted 114 guns and mortars; Fort Richmond's casemates alone could be armed with twenty-seven 32-pounders and its parade ground with three heavy and two light 10-inch mortars. Battery Hudson was to be armed with twenty-five 32-pounders and five mortars. On the summit of Signal Hill behind Fort Richmond, Fort Tompkins was in no better condition. Its 50 guns and two mortars commanded both the works below and the Narrows. Its casemates were to be armed with thirty 32-pounders and its barbette tier with twenty 24-pounders. On its parade were to be platforms for two heavy 10-inch mortars. By now, however, New York State's forts on Staten Island could no longer be relied upon or considered effective defensive works.(88)

While the works in the inner harbor had remained armed and even garrisoned when there were sufficient troops available, by the mid-1830s they were relegated to secondary importance for the defense of New York. The United States Forts Lafayette and Hamilton on Long Island now constituted the harbor's primary seacoast fortifications. In his annual report to Secretary of War Joel R. Poinsett,

the new chief engineer, Col. Joseph G. Totten, called on the administration of Martin Van Buren, asking that "some arrangement . . . be made whereby these works may be placed gradually, if not at once, either by the State of New York or the United States, in proper condition."(89)

Authorizing legislation was passed by Congress in 1836 for the purchase of the New York State property on Signal Hill. On February 15, 1847, the State of New York conveyed to the federal government ownership and jurisdiction to 47½ acres of land, upon which stood the State Forts Richmond and Tompkins, as well as Batteries Hudson and Morton, together with the waterfront and lands under water. It was upon this land that construction of a new fort on the site of New York State's Fort Richmond was planned. (In the ensuing years nearly 200 more acres would be added in Richmond County, Staten Island.) This action cleared the way for the U.S. to pull down the old sandstone forts and build new works on Staten Island.(90)

In the first comprehensive study of the nation's seacoast defenses since 1836, the Board of Engineers considered the defenses of New York Harbor. On Staten Island, the board reiterated earlier recommendations for the "repair" of Forts Richmond and Tompkins and Batteries Hudson and Morton. The board contemplated no new works other than a small redoubt on the hill southwest of Fort Tompkins, probably the same heights occupied by Fort Smith during the War of 1812.(91)

Lieutenant Lee Repairs Batteries Hudson and Morton

Lt. Robert E. Lee had scarcely been at Fort Hamilton a week when Totten assigned him to also repair Batteries Hudson and Morton on Staten Island. Lee commenced his repairs on Staten Island in June 1841.(92)

By November 1841, Lee had rebuilt Batteries Hudson and Morton's breastheight wall, graded and sodded the parapets, laid the barbette gun platforms, and prepared the batteries for their armament. The following year he intended to extend the battery and equip it with several shot furnaces. Battery Hudson was to be connected to the main battery with one or two small traverse magazines.(93)

Cognizant of the importance of Signal Hill, the site of the first Fort Tompkins, Lee seconded the recommendations of Colonel Totten urging Congress to gain possession of the old state forts. Totten finally authorized Lee to prepare plans for a new Fort Tompkins. The first Fort Tompkins, as well as the casemated marine battery at Sandy Beach known as Fort Richmond, were in Totten's opinion ruinous and useless.

During the 1842 work season, the repairs to Batteries Hudson and Morton continued. Three shot furnaces were built at Battery Hudson and a south branch that refused the battery to the right (west) was built, which also embraced the lighthouse and increased its armament by 13 guns. At the end of the year, the battery was in service, although two or three more traverse magazines were considered necessary along its length. The work at Battery Morton completed in 1841 included a 15-foot shot furnace, but the battery still lacked a small magazine.

Lee continued on duty at the Narrows into 1845, making such minor repairs as were necessary and as a member of the Board of Engineers for the Atlantic coast defenses he played a role in planning and locating seacoast fortifications. Fort Gansevoort, a Second-System work on the Hudson River built during the War of 1812, had by the 1840s been encroached upon by the growth of the city to such an extent that it was no longer a viable defense work. Colonel Totten advanced the idea of selling Fort Gansevoort and using the moneys realized to purchase the fortification sites on Staten Island not already owned by the federal government.(94)

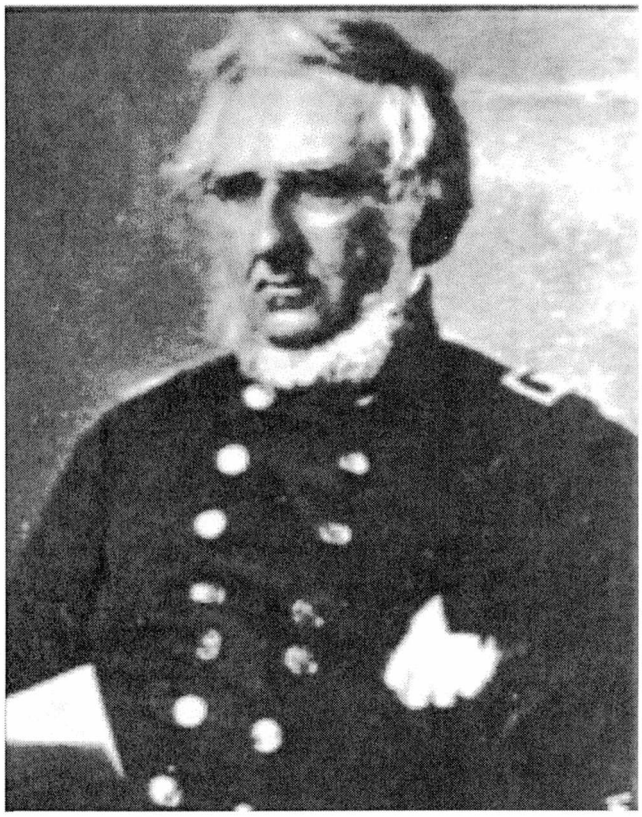
Lee found that the old state-owned works on Staten Island had been leased out as pastureland. To protect their slopes from grazing animals it was necessary to enclose Batteries Hudson and Morton

with fences in 1844. A general upgrading of Batteries Hudson and Morton was also undertaken that year when all the pintle blocks of the gun platforms were strengthened and banquettes were formed between the platforms and sodded. While the batteries were considered ready for service, their armament remained un-mounted. Thirty-eight guns were on the ground at the batteries, their carriages in a shed. An additional 22 guns would be required to fully arm the two batteries.

In 1846, progress was made toward selling obsolete Fort Gansevoort. By 1847, negotiations with the state for the acquisition of the Staten Island forts had been completed, and preparations were soon underway to construct new works on the sites occupied by Forts Richmond and Tompkins.(95)

Second Fort Richmond Constructed

The first project following the purchase of the fortification sites was the replacement of Fort Richmond, the old marine battery at Sandy Beach. To oversee the construction of the new fort, Totten chose Maj. Richard Delafield, one of the Corps of Engineers' preeminent engineers and superintendent of the Military Academy, to succeed Lee at the Narrows. Delafield was both a leading fortification engineer and an able executive. Preliminary surveys were conducted in 1847 and workshops and construction plant were set up. The old sandstone casemates were pulled down and the collection of granite begun. By September 1847, 3,695 cubic feet of granite had been cut and dressed for building the scarp of the new fort. A cofferdam 815 feet long, 15 feet wide, and between 11 and 18 feet high was built to enclose the foundations of that portion of the new work that would be standing in the water. Machinery included a steam hydraulic rotary pump, cranes, etc. Delafield made considerable progress in the 1848 season. Excavations were made for the foundations of the channel fronts, their scarps, and the connecting piers. The scarps themselves had been raised six feet above low water and between May 15 and September 1, all foundations and masonry below water had been secured with the exception of the southwest tower bastion that required driving pilings. The work accomplished was impressive: 95,407 square feet of stone cut and dressed, plus 39,520 bricks laid for culverts, drains, and sewers incorporated in the fort's foundations.(96)



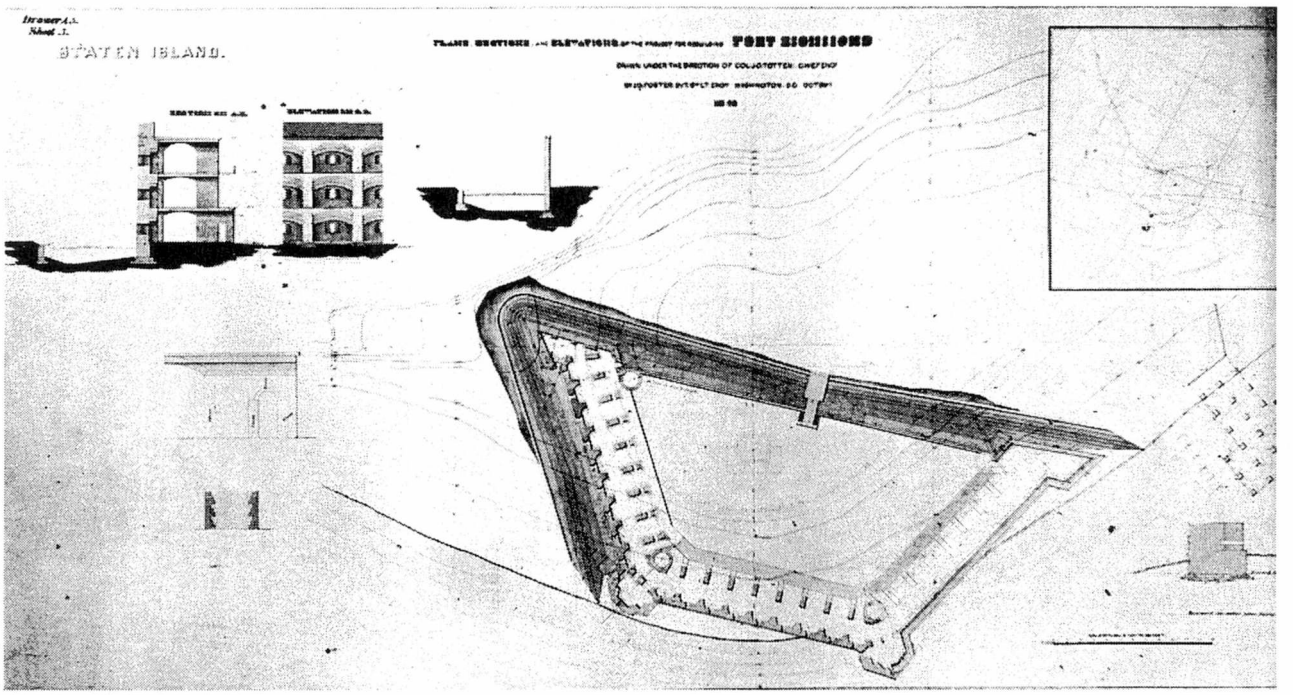
Maj. Richard Delafield. *Corps of Engineers*

During the 1849 work season, the work progressed steadily in proportion to the funds made available. By September 30, the scarp had been raised an average of two feet. All of the casemate piers on two fronts, half of those on a third front, and half of the magazines on the gorge had been raised about 11 feet above the foundations. The seawall had been built 240 feet. The following year, the ditch along the gorge front was dug; a magazine was commenced, and wharf construction continued. Considerable effort was made to cut and prepare the granite to be used in raising the scarp to the level of the parade ground. The gorge scarp had been raised to three or four feet above the parade. The parade itself had been filled with earth to its proper level.(97)

Progress during the 1850 season was retarded by the late appropriation of funds, coupled with increased demands for labor and materials in New York City. Major Delafield also noted that the location of the fortifications on Staten Island was threatened by increased expansion of settlements and he urged Congress to purchase a buffer zone between the federal property and a public road.(98)

In both 1851 and 1852 fiscal years, Congress withheld appropriations and work at Fort Richmond was carried on only because there was a small balance of funds from previous appropriations. By the end of the 1852 season, the last remaining funds were expended for masonry work on the arches of the first tier and the floor of the second tier. Fort Richmond had been raised high enough to form the arches of the second tier of casemates. The scarp of the gorge curtain had been raised to 34 feet above the foundations. Pending restoration of funding, construction of the fort was suspended in October 1852, the masonry leveled as uniformly as possible and the concrete covered with mastic and boards.

Funding was finally restored in August 1854 and construction was resumed. Tools and machinery were put in order and partly renewed, and stock was purchased. The coping of the land-front curtain was resumed and the land-front counterscarp was excavated, its foundations laid, counterscarp built, and coping laid during the winter as weather permitted.(99)



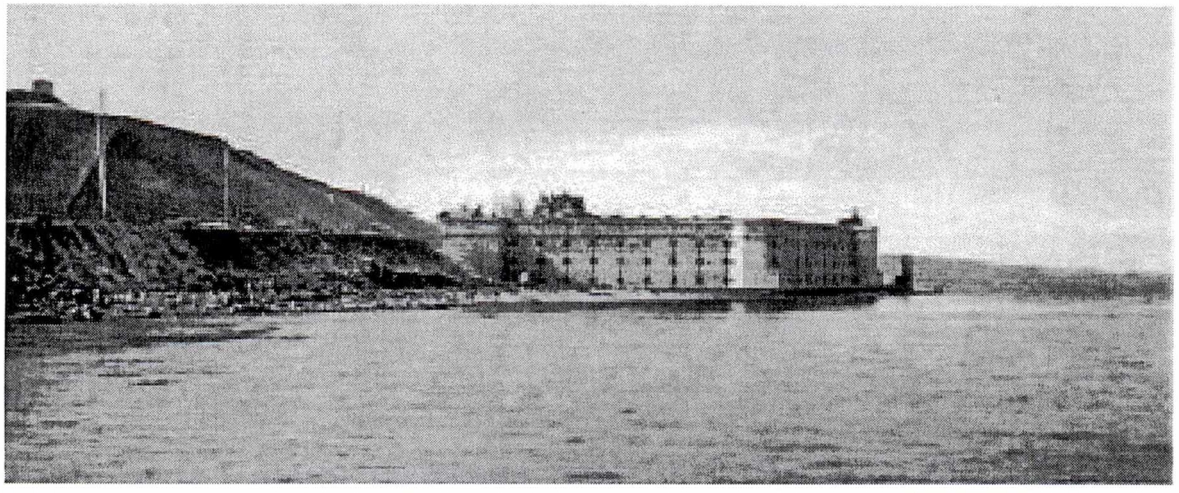
Plans and elevations of new Fort Richmond. *NARA*

With the coming of spring 1855, work was resumed on the arches of the lower tier of casemates; these were all completed with the exception of the four conical arches and the arches of the two tower bastions on the channel fronts. Difficulty procuring stone delayed the building of the permanent wharf until the spring of 1856, when Capt. George Dutton took over from Major Delafield, pending arrival of Maj. John G. Barnard in September 1856. With the largest appropriations yet in 1855 and 1856, Dutton was able to push the project forward energetically. The arches covering the lower-tier casemates were completed and the traverse stones and flagstones of the lower tier were laid. Thirty-three "New American" embrasures developed by Colonel Totten were installed in the lower tier. The piers of the second tier were mostly carried up to the spring lines of the third tier and the scarp was carried up more than 23 feet all around. A portion of the second-tier embrasure sills were also laid.(100)

Under Major Barnard's oversight, the construction of Fort Richmond was actively prosecuted. The north curtain scarp was raised an additional 20 feet, to almost 46 feet above the foundations and the east and south curtains to a height of 40 feet. The second-tier embrasures were constructed, as well as most of the embrasures on the third tier and their sills, and embrasure irons were set. The pan-coupes of the north and east channel tower bastions were arranged and their second-tier gun and flank howitzer embrasures constructed. All of the second-tier communication and main casemate arches, including those of the north channel tower bastion and the north gorge bastion, were commenced, as was the magazine of the second-tier service magazine. A portion of the flagging of the gunroom recesses was also laid.(101)

By 1858, Fort Richmond was rapidly approaching completion. The piers of the third-tier casemates had been raised to their full height and the arches of the south gorge bastion and the four arches in the south channel face and two in the north channel face were turned. The permanent wharf was finally commenced; the piles were driven, and the stone for the superstructure and its piers was collected and mostly dressed. The ironwork was on hand, awaiting installation in the superstructure.

During FY 1858/1859, the third tier of arches was completed; the scarp was raised to its full height, and the cordon and blocking course were laid, as well as the concrete roofs of the arches. About three-quarters of the roof surfaces were covered with asphalt, dry bricks. Gutter arches and manholes were made, and a portion of the earth covering applied to the casemate arches. The flagstone pavements of the second and third-tier floors were laid and the iron rails of the traverse circles procured for installation. In addition, a large portion of the masonry was pointed.



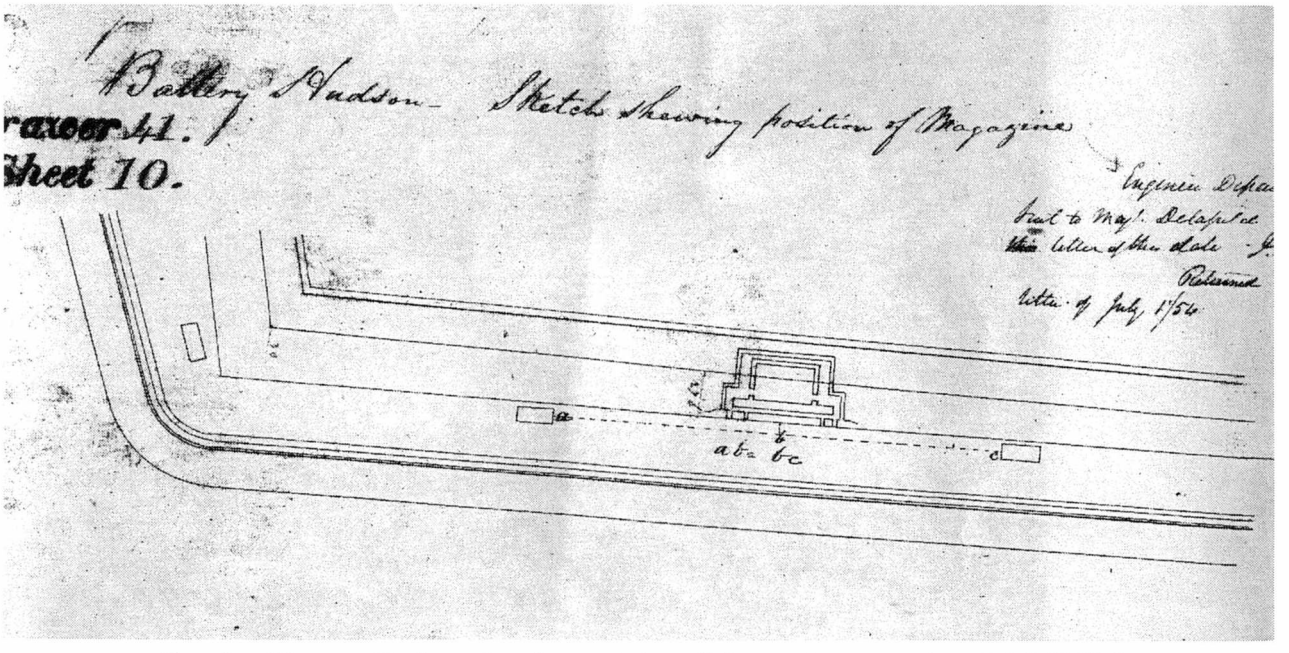
Fort Richmond from the Narrows, with South Cliff Battery at left. *Author's Collection*

As the earth covering was placed on the barbette tier, the stone for the columbiad gun platforms was cut and dressed and the iron rails etc., provided. The stone for the breastheight walls of the barbette tier was cut in preparation for installation. The stone stairs in the two central towers were also built. The permanent stone wharf resumed in 1858 was completed and equipped with an iron crane to replace the wooden crane used during construction. The cost of enlarging the principal magazines abutting the gorge curtain on either side of the sallyport entry and hanging their doors and shutters was estimated at $15,000. Barnard noted that the work was ready for three-fourths of its armament, and could be completed by the end of the 1859-1860 fiscal year. The final work involved completing the roofing of the third-tier arches, forming the terrepleins and parapet, laying the columbiad platforms, completing the pointing of the masonry, putting up the drawbridge and gatehouse, completing the counterscarp, grading the parade, and excavating the dry ditch on the fort's land front.(102)

In November 1860, Fort Richmond was structurally complete, ready in all respects to receive its 116 heavy channel-bearing guns. Fifty-eight of these were to be barbette 8-inch columbiads, with an additional fifty-eight 42-pounders in the fort's three casemated tiers. In addition, twenty-four 24-pounder flank howitzers were to be in the flanks of the tower bastions. The remaining arches of the third tier were asphalted. The additional columbiad platforms were laid on the barbette tier and their iron rails and pintles installed; the breastheight wall was completed and the terreplein and parapet formed and sodded. The exterior magazines had been built up to their copings. Finish work proposed for the following year consisted of equipment sheds over the magazines and penthouses over the circular stair towers. Some minor additional work was still planned for 1861: completing the counterscarp on the channel fronts, constructing traverses around the magazine entries, and building shot furnaces. Barnard planned to complete the arrangements for the guardhouse and the drawbridge over the dry ditch, finish the counterscarp and seawall, and lay its external rip-rap protection.(103)

Additional Improvements at Battery Hudson

When Congress restored funding for seacoast fortifications in August 1856, Major Delafield undertook a minor project that had been laid aside some years earlier, the service magazines at Battery Hudson. In the waning days of FY 1853/1854, construction commenced on the first of two magazines for the extensive barbette battery. Excavations were made, foundations laid, and the North Service Magazine facing the Narrows was completed in late winter of 1855. In April 1855, the second or South Service Magazine in the right-most angle of Battery Hudson was built by late September. Both structures were to the rear of the battery line and of the same design. Each consisted of a main arch of brick masonry with an offset entry and window "blinds" to safely permit lantern illumination of the magazine interior. The concrete over the primary brick arch in turn had a thick earthen cover, rendering the magazine bombproof. When completed, Delafield reported both magazines perfectly dry and serviceable. When Captain Dutton temporary succeeded Major Delafield in September 1856, he continued the finish work in the magazines, fitting up and hanging composition doors to keep them dry and ready for use.(104)



Sketch of Battery Hudson showing position of the service magazine, 1856. *NARA*

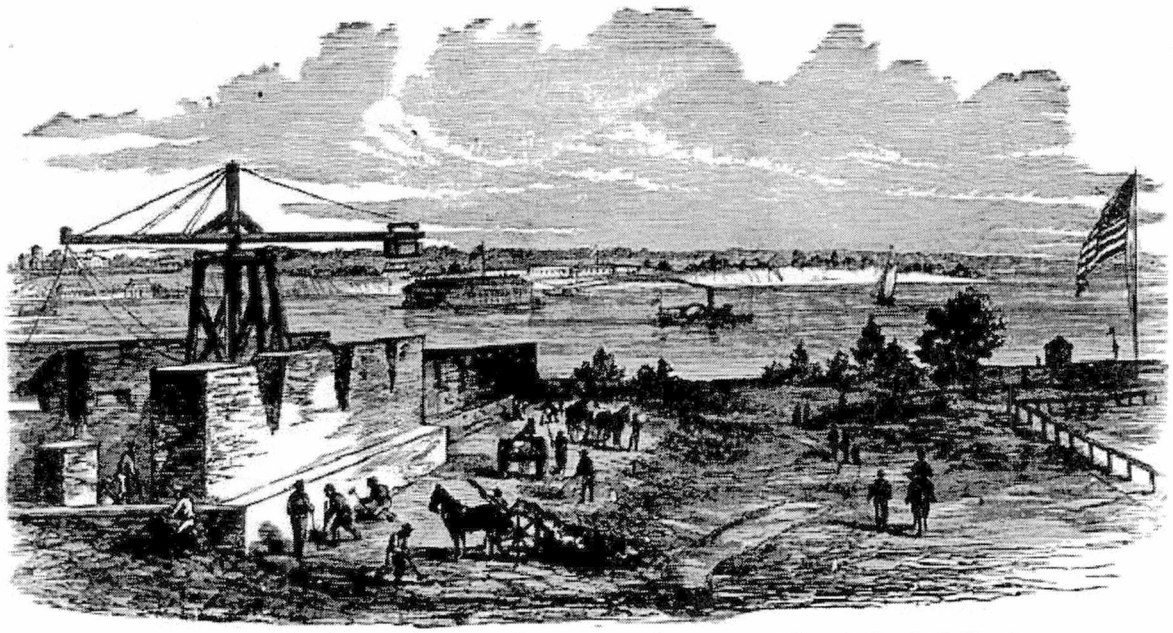
Batteries Hudson and Morton were ready for their armament, Battery Hudson for forty 42-pounders and ten 8-inch columbiads, smaller Battery Morton on the hill behind Battery Hudson for nine more 42-pounders.(105)

Fort Richmond Renamed

On November 7, 1865, shortly after the 1st Artillery arrived on Staten Island, War Department General Order No. 161 renamed Fort Richmond for Brig. Gen. James Samuel Wadsworth. A New York native, he had served as volunteer aide-de-camp to General McDowell in 1861 and had been appointed brigadier general of volunteers in August 1861. He was posthumously brevetted major general of volunteers for his gallant conduct in the Battle of Gettysburg and at the Battle of the Wilderness, where he was mortally wounded May 6, 1864.(106)

A New Fort on the Site of Fort Tompkins Authorized and Built(107)

Essentially abandoned following the War of 1812, the site occupied by Fort Tompkins I atop Signal Hill commanded Fort Richmond and Batteries Hudson and Morton. Loss of Signal Hill would result in the loss of the batteries below and contribute to opening the Narrows to a hostile fleet. This had been fully recognized by the Board of Engineers when it reported on the defenses of the Atlantic seaboard in 1840. The need to acquire the property from New York State had been regularly brought to the attention of secretaries of war through much of the next decade. When negotiations with New York State were completed in February 1847 and the 47.5-acre tract was ceded to the United States, the first priority had been to secure the channel by placing Batteries Hudson and Morton in good order and building a new and more powerful Fort Richmond. As that four-tiered battery's construction progressed in 1851, attention turned to planning a new fort on the summit of Signal Hill and protecting the fortification sites from encroachment by the expanding communities. Additional property acquired in 1856 for $43,300 enabled the War Department to proceed with planning the new Fort Tompkins.(108)

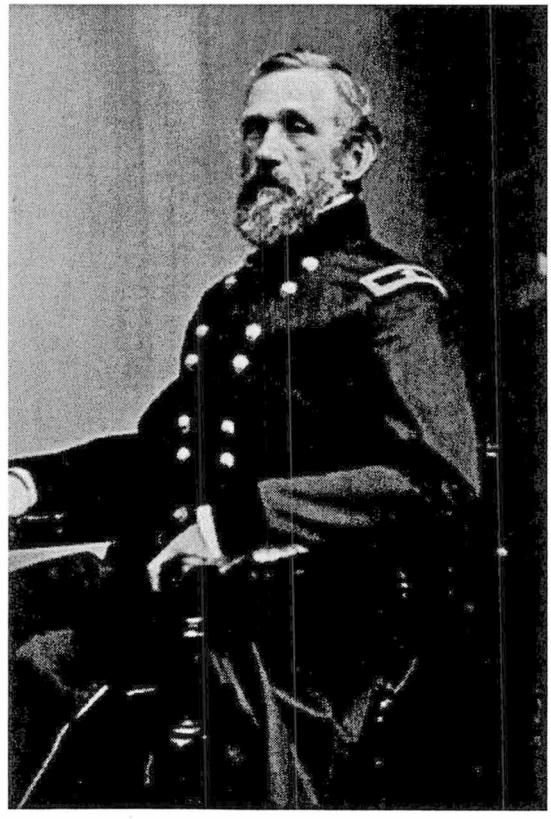


Construction of the fort at the site of Fort Tompkins, ca. 1860. *Author's Collection*

In 1857, Congress appropriated $150,000 to initiate construction of the new fort. Major Barnard, engineer in charge of the fortifications at the Narrows and Inner Harbor, reported that as the plans for the new fort had not yet been completed and approved by the Engineer Department, little was accomplished before the onset of winter. The plans were completed over the winter and approved by Colonel Totten at the end of April 1858. It was not until July 8, 1856, that a large work gang could begin demolishing the old sandstone fort. Pulling down the old work and grading the site occupied the remainder of the summer and autumn.(109)

While the bricks in the old fort were saved and cleaned for reuse, the sandstone scarps of the old work were used in part to form the north, northwest, and south glacis and the area to be occupied by the new fort was lowered several feet to 138 feet above the water. The excavated earth, nearly 100,000 cubic yards, was applied to the glacis slopes. By the end of July 1859, the construction plant was in place. This included a tram-like machine powered by a steam engine that moved up and down an inclined plane from the Fort Richmond wharf up some 125 feet to the plateau adjacent to where the fort was to be built. Construction materials were moved up the incline to the plateau, where they moved by rail to where cranes in the ditch of the new fort could pick them up and distribute them. Little time was lost laying the foundations of the scarp, counterscarp, and rifle gallery walls in the north and west flanks, as well as a portion of the south flank foundations. During FY 1859/1860, the foundations were completed and the scarp was raised on the north, northwest, southwest, and south fronts up to the lintels of the first tier loopholes. The casemate piers behind them were built up to the corbelling of the second floor. The concrete of the counterscarp galleries was brought up to the spring lines of the gallery arches, their supporting piers were built, and about half of their communication arches were turned. The rear wall of the counterscarp was raised to the same height as the counterscarp. By the end of July 1860, 100 linear feet of main culvert had been laid as well, and the revetment at the site of the caponnier was formed.(110)

Noting the relatively meager allotment for the new Fort Tompkins in FY 1860/1861, Major Barnard urged Totten to request $200,000 for FY 1861/1862 to complete the masonry. Fort Richmond was ready for its armament, and barracks casemates would be needed to house the garrison. Completion of the fort on the hill was urgently needed to bring New York Harbor into a state of "defensibility." Using the last of the small allotment, Barnard spent the last six months of 1860 turning the arches of the counterscarp gallery and adding a few more courses of granite to the scarp and counterscarp. Bernard's request for funding became all the more urgent with the outbreak of the Civil War. Although Colonel Totten sympathized with his engineer at the Narrows, was only able to allot $50,000 for Fort Tompkins in the next fiscal year. An additional $200,000 was allotted in 1862/1863 and in July 1864, an additional $150,000 was made available.(111)



Maj. John G. Barnard. *Corps of Engineers*

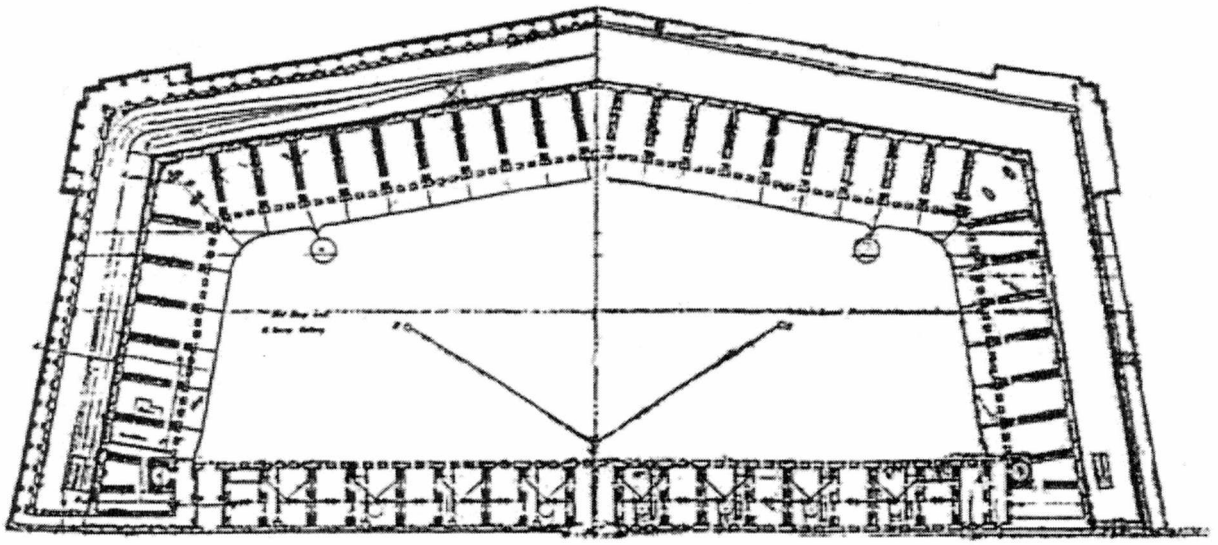
Civil war brought increased costs and shortages of labor and materials. Since nearly all the engineer officers were in the field with the armies, supervision of the New York fortifications fell to William P. Trowbridge, the agent

of the Engineer Department who maintained his office in the city, and the civilian foremen at the several forts. While steady progress was made at "the fort on the site of Fort Tompkins," it was still far from finished when the war ended in 1865.

Maj. and Bvt. Col. Fredrick E. Prime relieved Trowbridge as engineer in charge at New York Harbor in 1865. The counterscarp and its galleries were complete, but the glacis on those fronts had yet to be formed, graded, and sodded. Prime found the fort enclosed on three sides and nearly all the rough concrete work completed. The casemates of the east front overlooking the Narrows, however, remained to be built, along with nearly all the interior finish work on the other three fronts. Improvements in artillery during the Civil War bought the value of vertical masonry scarps into question. Consequently, the decision was made to alter the design of the channel front of the fort on Signal Hill.

With substantial funds and a labor force at hand, Prime made excellent progress in 1865. Much of the work was carried out on the land fronts. Fourteen barbette gun platforms were built on the barbette tier of the south and north fronts, their pintle plants and traverse irons put in place. Sixteen granite chimney caps were set and the parapet and terreplein on the land fronts filled and sodded. The concrete floors of the barbette traverse magazines were also poured. Inside the fort, good progress was made preparing space to house the garrison. Nine casemate floor arches were formed and turned, and all of the first-tier casemates on the land front and seven on the second tier received brick linings. In addition, 116 casemate windowsills, 60 hearthstones, and all the doorsills on the first tier were set in place. Iron doors, windows, and hoisting-sash frames were put in position in all doorways, embrasures, and loopholes of the land fronts. All first and second-tier casemate floors were concreted, nine were floored and whitewashed, and their windows were glazed by the latter part of 1866.

In the north and south flanks the flagstone passageways to the ditch were laid and a part of their walls built. On the south front, the scarp was carried up about two courses and backed; the parade wall was also raised about one course and the gorge front casemate piers were built. Two cisterns in the angles of the parade ground as well as several smaller cisterns under the officers' casemates in the gorge were also built. All drains and culverts in the parade ground and ditch were completed, the parade was graded and cleared of debris, and a concrete sidewalk was laid. The leaking roofs of the second-tier magazines exposed to winter snows were repaired and the first and second-tier floors were repaired and covered with asphalt.



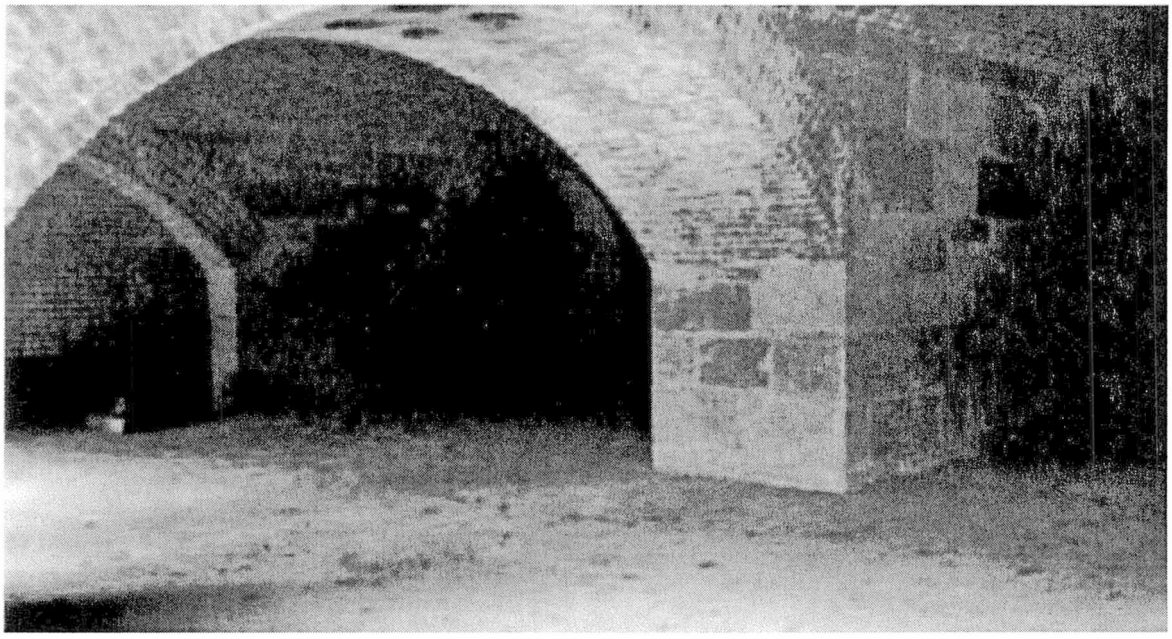
Plan of fort on the site of Fort Tompkins. *NARA*

Outside the fort Prime set a crew to work filling and grading the glacis on the land fronts. A roadway was built and macadamized from the plateau where the fort was sited down the slope to Fort Wadsworth. In August 1865, Prime was relieved by Col. and Bvt. Maj. Gen. John G. Barnard, who returned to Staten Island to resume the construction of the fort on the site of Fort Tompkins.(112)

During FY 1866/1867, five additional casemates were furred, 21 more floored (11 on the first tier and 10 on the second), and nine more fitted up as enlisted quarters (six in the south flank and three in the southwest flank). All doorways in the fort were provided with suitable wrought-iron doors, so very little except glazing remained to render all the casemates in the four land faces ready for occupancy. The gun platforms on the four land faces of the fort were finished and readied for their armament.

Outside the fort, the road down to North Cliff Battery had been cut and formed and the slopes on either side brought into shape and partially finished. The extensive rain damage and erosion to the slopes on the channel front was repaired and a 12-inch drain from the South Latrine to the foot of the slope was put in place.(113)

After only about a year at Staten Island, General Barnard was relieved by Maj. and Bvt. Maj. Gen. Quincy A. Gillmore in 1867. Gilmore was superintending engineer at the Narrows for the next 18 years, rising to full colonel of engineers. He would also see completion of the fort on Signal Hill and several other batteries on Staten Island.(114)



Interior of channel front casemates. *Author.*

While little work was done in 1867 and 1868 beyond improving the cisterns, constructing the south latrine, and preserving slopes, etc., by 1869 plans for completing the east (channel) front had been finalized. It was to be completed with a single tier of casemates closed in front with a low masonry scarp behind a coverface, surmounted by a high earthen parapet furnishing a high, elevated battery for six pairs of heavy guns on barbette carriages, separated by traverse magazines. Gillmore estimated that this work would require about $300,000 to complete and requested $60,000 from the next appropriation. He also requested that the unexpended balance of $230,468 for the suspended Casemated Battery be used to complete the new fort.(115)

It was not until 1871, however, that actual progress was made toward completing the channel front. Piers and arches of the 17 bombproofs between the two sallyports, including the foundations for the casemate extensions, were constructed. The scarp between the sallyports was finished with the exception of a temporary gap in the center, left for construction materials. The piers and skewback courses of the sallyport arches were built and the parade wall was carried two feet above the top of the parade arches and the concrete that formed their roof surfaces. These surfaces were also made ready for their mastic coverings. The system for draining rainwater from the terreplein to cisterns beneath the channel front was also completed. The iron balcony for the parade wall of the channel front was ready for installation. Earth excavated from the parade formed the coverface in front of the channel front.

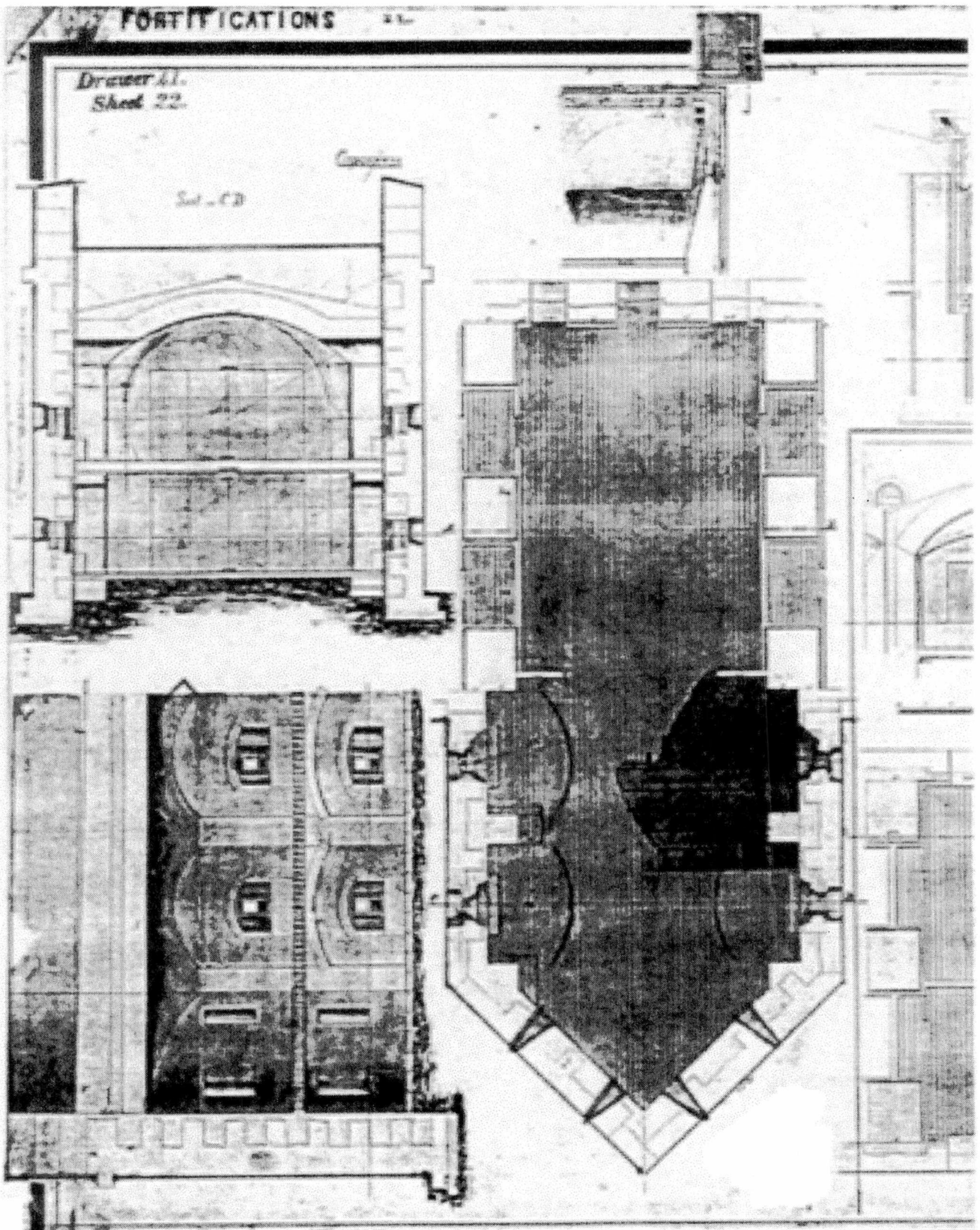
During the 1872 work season, all the masonry of the two gateways and the sallyport arches, and the walls and arches of the passageways through the sallyports were finished and their roofs as well as the casemate roofs covered with mastic. They then received their earth coverings. The gap in the center of the channel front was closed. The scarp was lowered by five feet and the coping re-laid. This increased the protection from the coverface. The granite parade wall was finished with the exception of its coping, and the masonry of the four traverse magazines was carried up to the spring lines of their arches. The second-tier iron balconies and stairs and on the channel front were 90-percent completed. (116)

Finish work on the fort continued into 1876. The earth of the channel-front terreplein as well as the masonry and earthen coverings of the traverse magazines were finished, and the timber gun platforms were constructed and laid. The coping of the channel-front parade wall was laid and the north and south stairways to the iron balconies completed. Solid timber doors were made and hung on the channel front's five service magazines. On the land fronts, the casemate quarters of the south and southwest faces were furred with brick and the wooden ceilings in the second tier begun. The second-tier iron balcony for the four land faces were put up and its four stairways built. As soon as the earth on the terreplein had compacted, 10 timber gun platforms were laid in pairs on their concrete foundations along the channel front and the masonry breastheight wall was constructed in front of the guns. The terreplein was then graded and sodded with grass. Fitting up the casemate quarters on the land fronts also continued until all had their wood ceilings and floors. The cut and dressed granite sidewalls of the sallyports were built and loopholed, their floors paved with granite blocks, and their grated gates made and hung. In 1876, construction of the almost complete fort was suspended when Congress ceased funding seacoast fortifications. In future years, the only funds made available were small amounts for essential repairs and preservation of the fortification sites.(117)

On July 15, 1874, Brig. Gen. Andrew A. Humphreys, chief of engineers, wrote the secretary of war suggesting names for the numerous unnamed fortifications. Humphreys recommended that all the works on Staten Island be named Fort Clinton for George Clinton of New York, an officer of the Revolution and former vice president of the United States. He recommended the new fort on the site of Fort Tompkins be named Battery Tompkins and the former Fort Richmond, later Fort Wadsworth, be redesignated Battery Wadsworth. While the secretary of war viewed with favor a few of the chief engineer's recommendations, he did not approve the recommendations regarding the works on Staten Island.(118)

The Staten Island Garrison in the Civil War, 1860-1865

The completed Fort Richmond was not placed in service with the outbreak of hostilities in 1861, as its armament had not been mounted. Further, troops available on Staten Island were fully occupied manning Batteries Hudson and Morton. Staten Island, however, was turned into an armed camp.



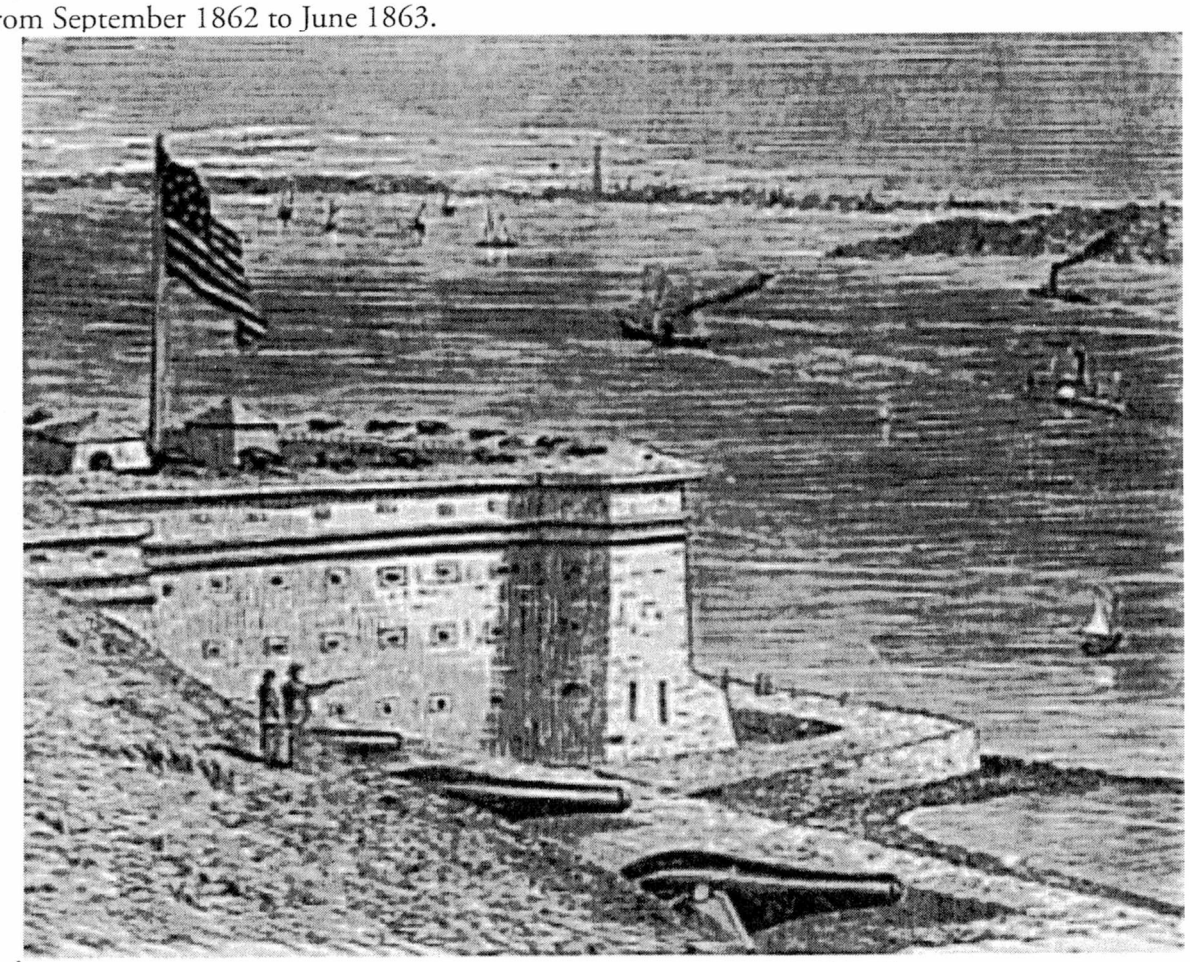
Detail drawings of the sallyport elevation, projected but not built caponnier, and exterior views of loopholes and embrasures. *NARA*

Camp Scott was established as a camp of instruction, where the 3rd, 4th, and 5th Excelsior Regiments were organized as the 72nd, 73rd, and 74th NY Volunteer Infantry Regiments of Sickles Brigade, between July and October 1861. The 2nd NY Heavy Artillery Regiment was organized there between September and December 1861 before departing for Washington, D.C. The 127th NY Volunteer Infantry (National Volunteers), the 145th NY Volunteer Infantry (Stanton Legion), and Companies G, H, I, and K, 169th NY Volunteer Infantry (Troy Regiment), trained at Camp Scott in September 1862 before departing for the seat of the war near Washington, D.C., in October.

The 5th NY Heavy Artillery (2nd Regiment, Jackson Artillery) was organized through consolidation of the Jackson Heavy Artillery, the 2nd Jackson Heavy Artillery, and 3rd Bn, Black River Heavy Artillery. Assigned to New York Harbor's defenses March 11-May 27, 1862, a portion of its eight companies garrisoned Fort Richmond before departing for Baltimore, MD, in late May. In all probability, the 5th NY Heavy Artillery trained and drilled with the guns of Battery Hudson while on Staten Island.

The 4th Bn, NY Heavy Artillery (1st Bn, Black River Artillery), organized at Sacketts Harbor, NY, was mustered in on September 11, 1862, and ordered to Fort Richmond until December 1862, when it was merged into the 10th NY Heavy Artillery Regiment.

The 10th NY Heavy Artillery (Black River Artillery, also known as the "Jefferson County Regiment,") was organized on Staten Island by consolidating the 4th, 5th, and 7th Bns of Black River Artillery on Dec. 31, 1862. Companies B, D, E, and M were assigned to Ft. Richmond and Sandy Hook from September 1862 to June 1863.

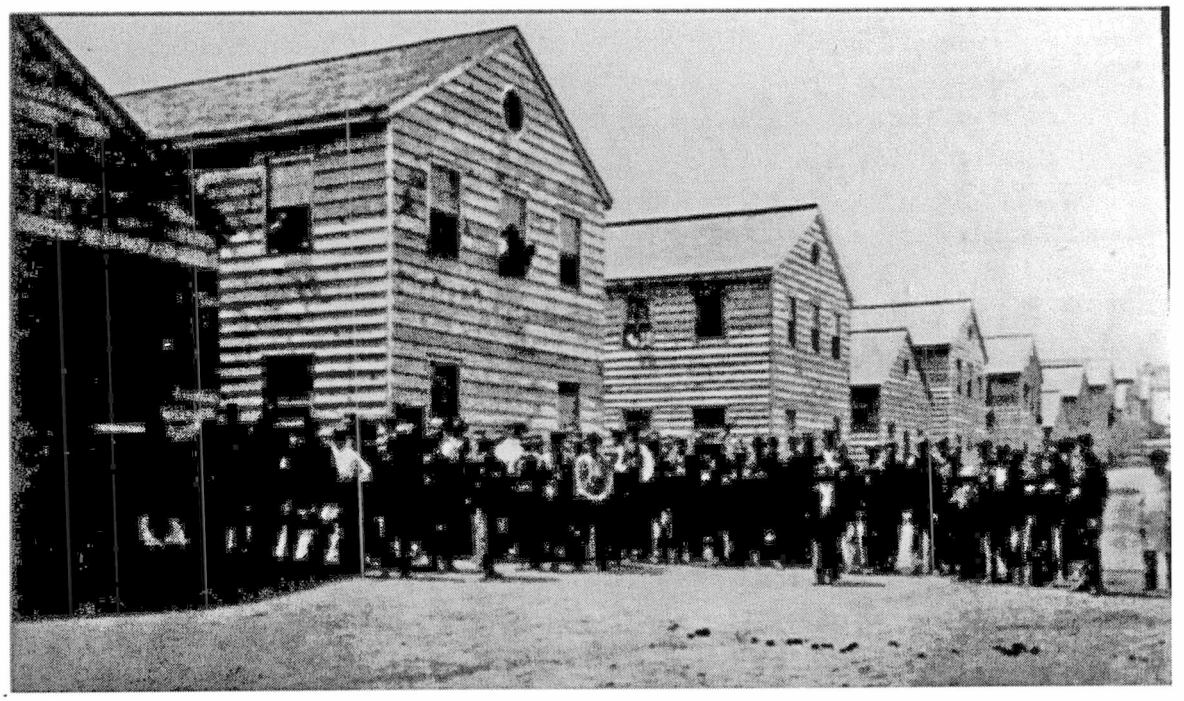


Right flank of Fort Richmond, ca 1860. *Author's Collection*

In July 1863, four companies of the 11th NY Heavy Artillery were stationed at Fort Richmond and Sandy Hook. Later that year, the 14th NY Heavy Artillery (3rd Bn, German Heavy Artillery) was organized. Companies A through F were assigned to forts in NY Harbor in October 1863. Companies I and K were posted at Fort Richmond December 24, 1863, where they were joined by Companies L and M in January 1864. The four companies served at Fort Richmond until April 1864, when the 11th NY Heavy Artillery was forwarded to the Army of Potomac.

The Regulars returned to New York Harbor with the end of the war and Batteries A, B, and E, 1st US Artillery, arrived at Fort Richmond in October 1865. The 1st Artillery manned the fortifications on Staten Island until 1872, when the regiment was transferred to the Southeast in exchange for the 3rd Artillery.(119)

Col. Henry S. Burton, commanding the 5th US Artillery, established regimental headquarters at Fort Richmond from late July 1864 until October 25, 1865, when it moved to Fort Monroe, VA. (120)



Temporary timber barracks erected during the Civil War to house the garrisons of Fort Richmond and the exterior batteries. *NARA*

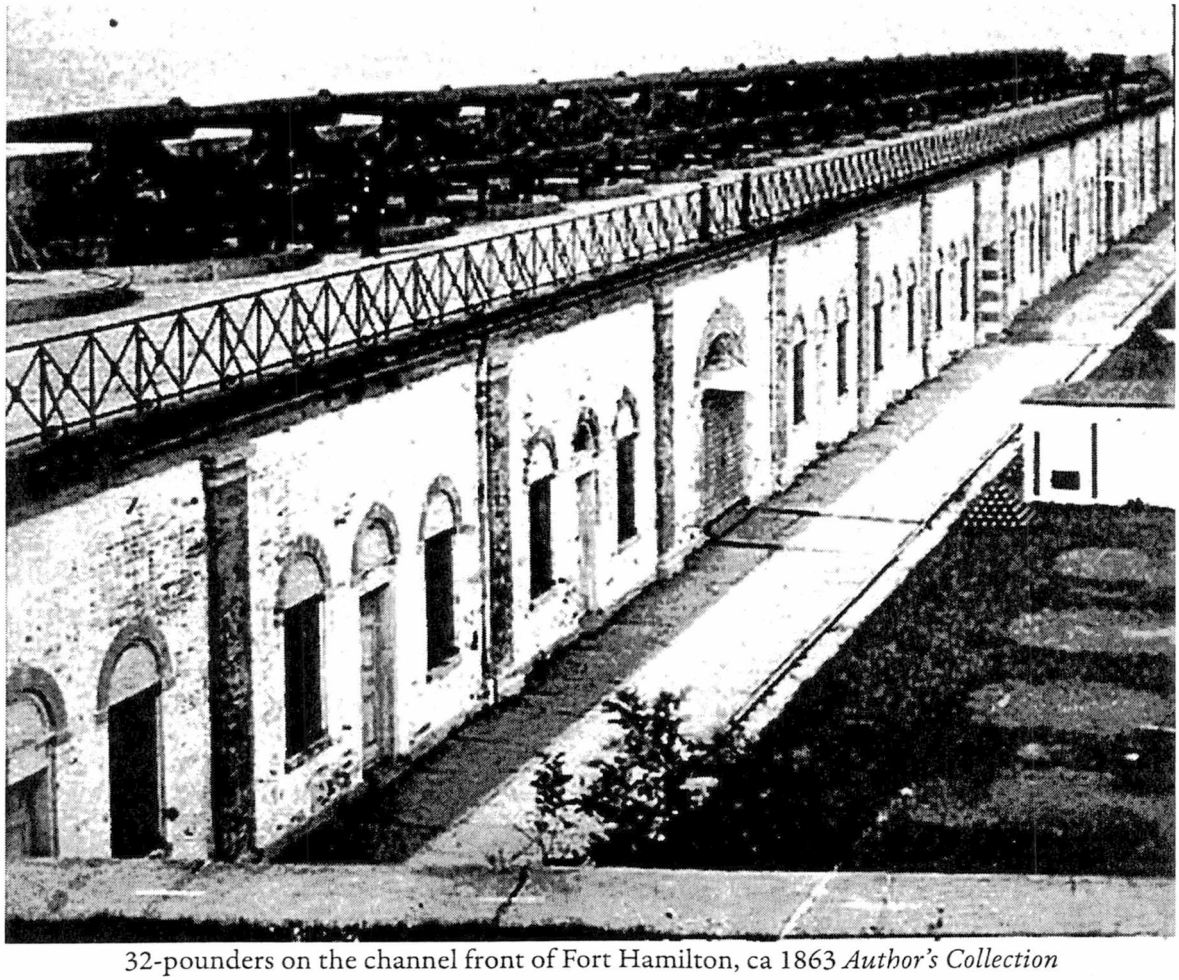
Forts Hamilton and Lafayette in the Civil War

Companies H and K of the 2nd US Artillery, commanded by Col. Harvey Brown, was still garrisoning Forts Hamilton and Lafayette in 1861, on the eve of the Civil War. Company D, evacuated from Texas early in 1861, was briefly posted at Fort Hamilton before being ordered to the US Arsenal at Fayetteville, NC. Brown's regiment was soon ordered to Washington, D.C., and the 2nd Artillery was replaced on April 19 with the arrival from Charleston, SC, of the headquarters and five companies of the 1st Artillery under the command of Maj. Robert Anderson, who had been forced from Fort Sumter there. A few days later, five companies, B, D, G, H, and K, of the 3rd Infantry, arrived from Texas to bolster the Fort Hamilton garrison.(121)

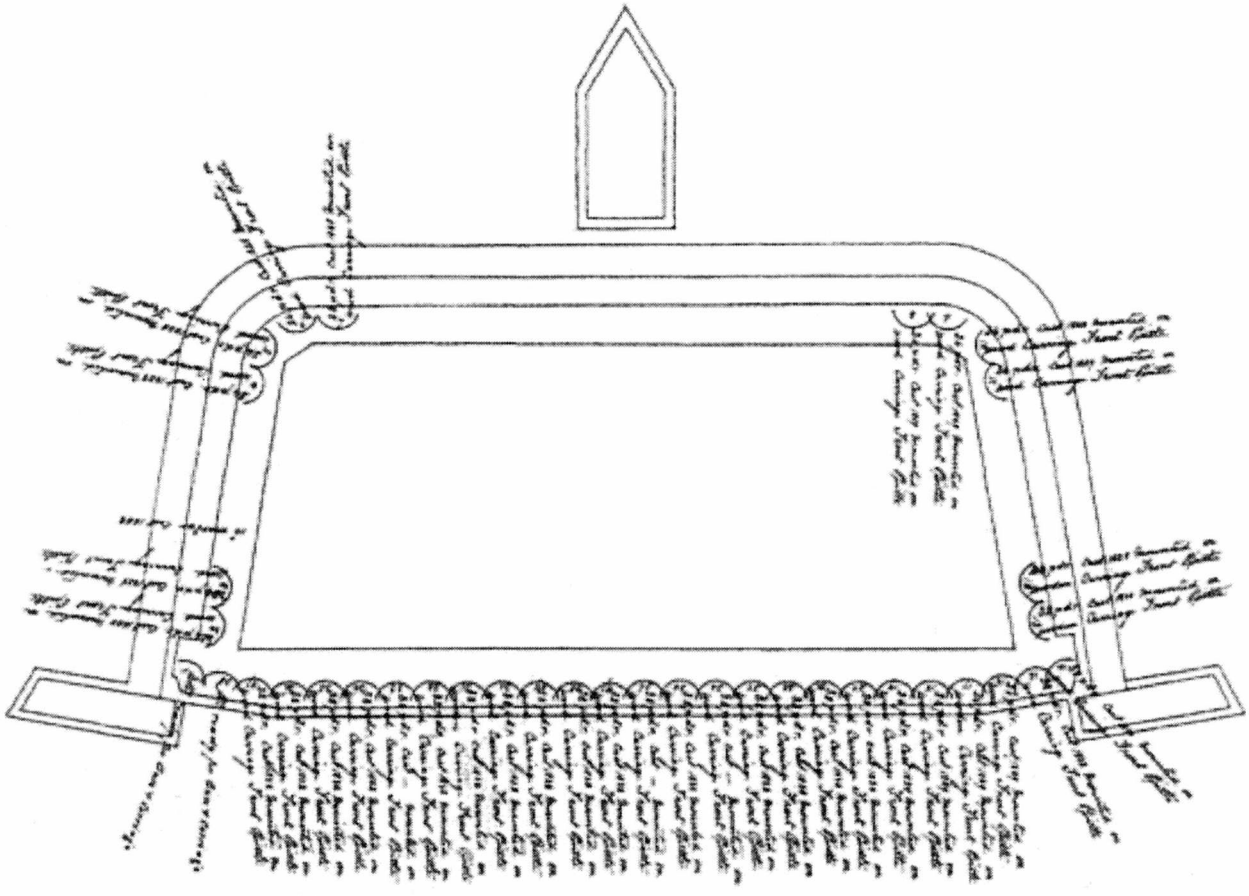
On May 4, 1861, the 5th US Artillery was constituted. While most of its elements were organized at Camp Greble in Pennsylvania, Battery G was organized at Fort Hamilton and remained stationed at the Narrows until December 18, 1862, when it was transferred to the Department of the Gulf.(122)

Fort Hamilton also became a rendezvous for new recruits and regiments of New York Volunteers during the first year of the war, and Regular Army recruits were organized into a battalion of the 12th Infantry at Fort Hamilton on October 20, 1861. Elements of the 12th Infantry remained at the fort until March 1862, when the regiment departed for Washington D.C. The garrison increased rapidly until there were about 1,000 men from the newly organized 5th US Artillery Regiment and the 12th Infantry posted on the Long Island side of the Narrows. A succession of officers commanded at the Narrows during the war. Companies G and H, 14th NY Heavy Artillery, were assigned to Ft. Hamilton until April 1864, when they were transferred to the Army of the Potomac.(123)

Following the Civil War, Fort Hamilton's armament was gradually reduced. The guns in the casemates and most of those along the barbette tier, relatively small and on old-style platforms, were dismounted and replaced to some extent by heavier guns in the forts exterior batteries. By the late 1870s, the sole armament of the enceinte of the fort was three 10-inch and two 8-inch seacoast mortars mounted on the barbette tier of the channel front, all on decayed wooden platforms. The fort's east front was officers' quarters, the embrasures cut down to form doorways accessing the earth closets in the ditch. The redoubt east of the enceinte was in good repair but its 24-pounder flank howitzers had been dismounted and the structure was in use as the post bakery.(124)



32-pounders on the channel front of Fort Hamilton, ca 1863 *Author's Collection*



Arrangement of armament of Fort Hamilton. *NARA, Drawer 40, Sheet 47, Archives II.*

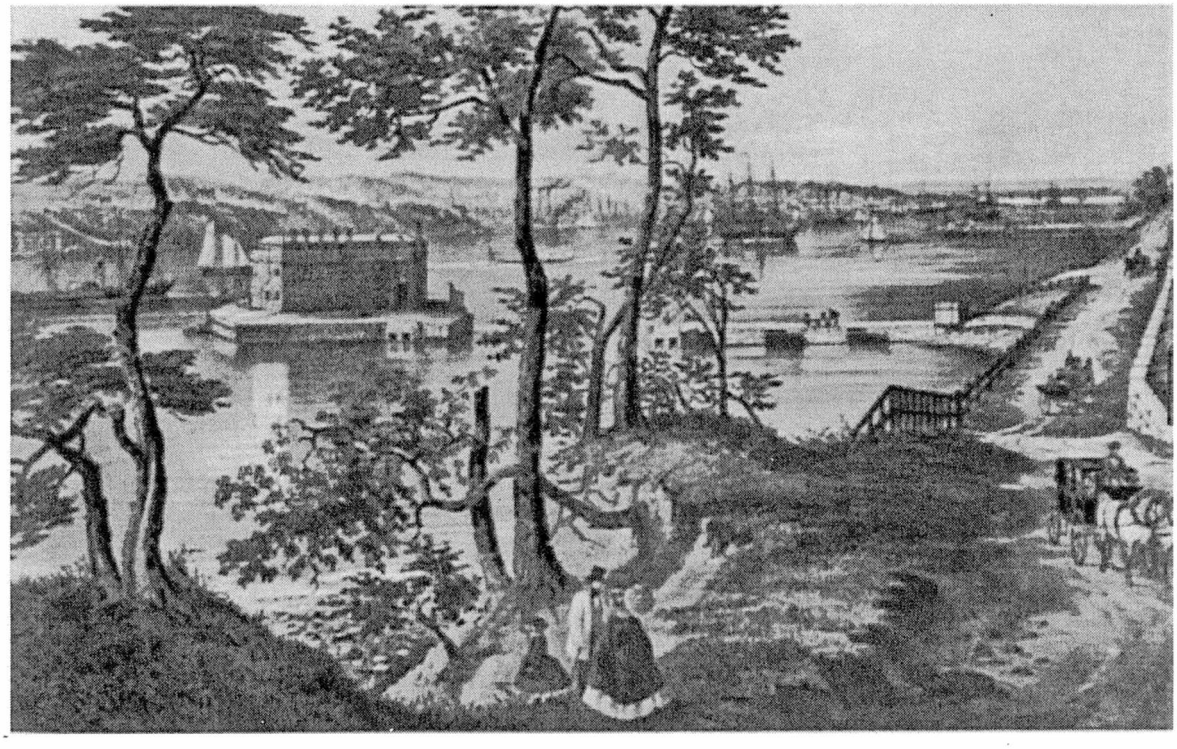
Fort Lafayette Becomes a Prison for Confederates

Almost at the outset of Civil War the fort had had been pressed into service as one of the first seacoast fortifications in the North to hold political prisoners. Some of the first inmates had done nothing more than express sympathy for the South: members of the Maryland legislature; Baltimore's police commissioners; James W. Ball, a New Jersey Democrat later elected to the US Senate; and Francis K. Howard, a Baltimore newspaper editor and grandson of Francis Scott Key. The war had not progressed long before Fort Lafayette's role was expanded to include military prisoners. In particular, all officers who had resigned commissions in the US Army to join the Confederacy were, if captured, automatically sent there.

On July 15, 1861, Fort Lafayette became a military prison when Edward D. Townsend, assistant adjutant general, ordered Maj. Gen. Nathaniel P. Banks to take prisoners captured by General McClellan in West Virginia to New York to be kept in Fort Lafayette. Townsend advised Banks, "A permanent guard will be ordered to the fort in time to receive the prisoners." Fort Lafayette was manned by one or two companies from Fort Hamilton's garrison. These units formed the guard detail for prisoners during the Civil War. The first Confederate prisoners arrived at Fort Hamilton on July 22. They were searched and had their names entered on the roll of prisoners before being marched down to the wharf to the boat for the quarter-mile trip to the fort on Hendricks Reef.

The prisoners were confined in the fort's two principal casemated fronts and in four casemates of the lower tier on the Long Island side of the fort. All had been converted into prison rooms by brick-

ing up the open entrances. The casemates were lighted by five embrasures measuring about 2 feet by 2 feet, covered with iron gratings. Five large doorways, 7 or 8 feet high, with solid folding doors, opened to the parade ground from the prison casemate walls. The four vaulted casemates of the lower tier on the Long Island side were eight feet at their highest, 24 feet deep, and 14 feet wide. Each was lighted by two small loopholes in the outer wall and one on an inner wall. The large wooden doors of the casemates were shut and locked from 9:00 p.m. until daylight. Although the rooms remained dark and damp most of the time, they had fireplaces, which the gun casemates on the principal fronts lacked. Later, stoves had to be installed in the gunrooms to combat the cold. The only furniture in either was a few beds.

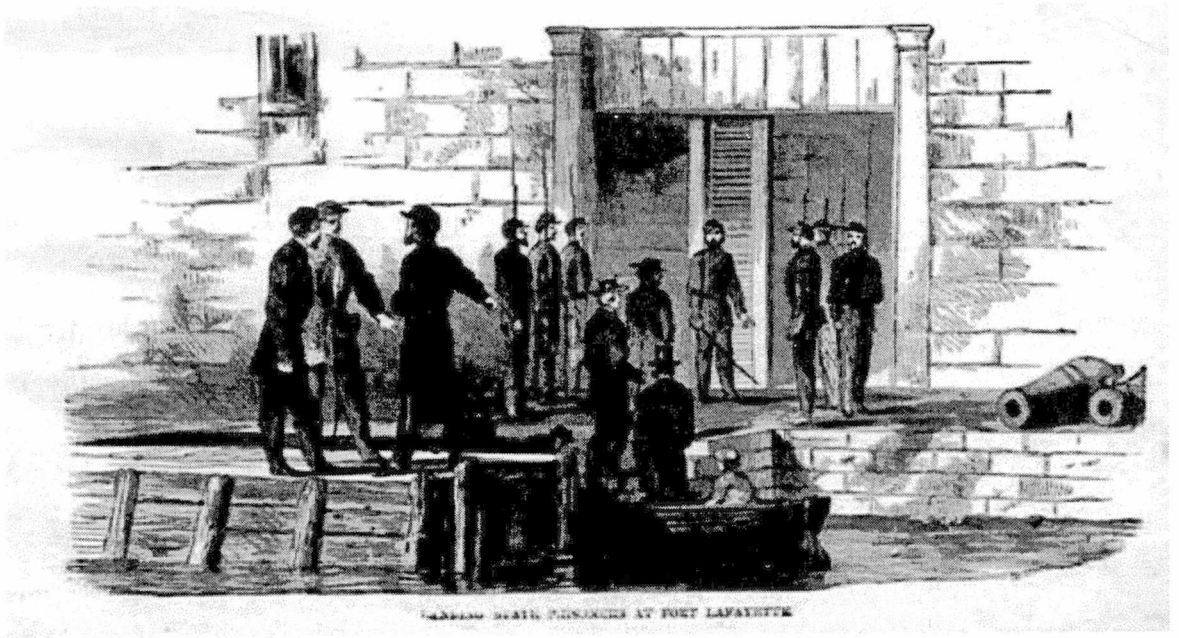


Fort Lafayette viewed from Long Island, south of Fort Hamilton. *Author's Collection*

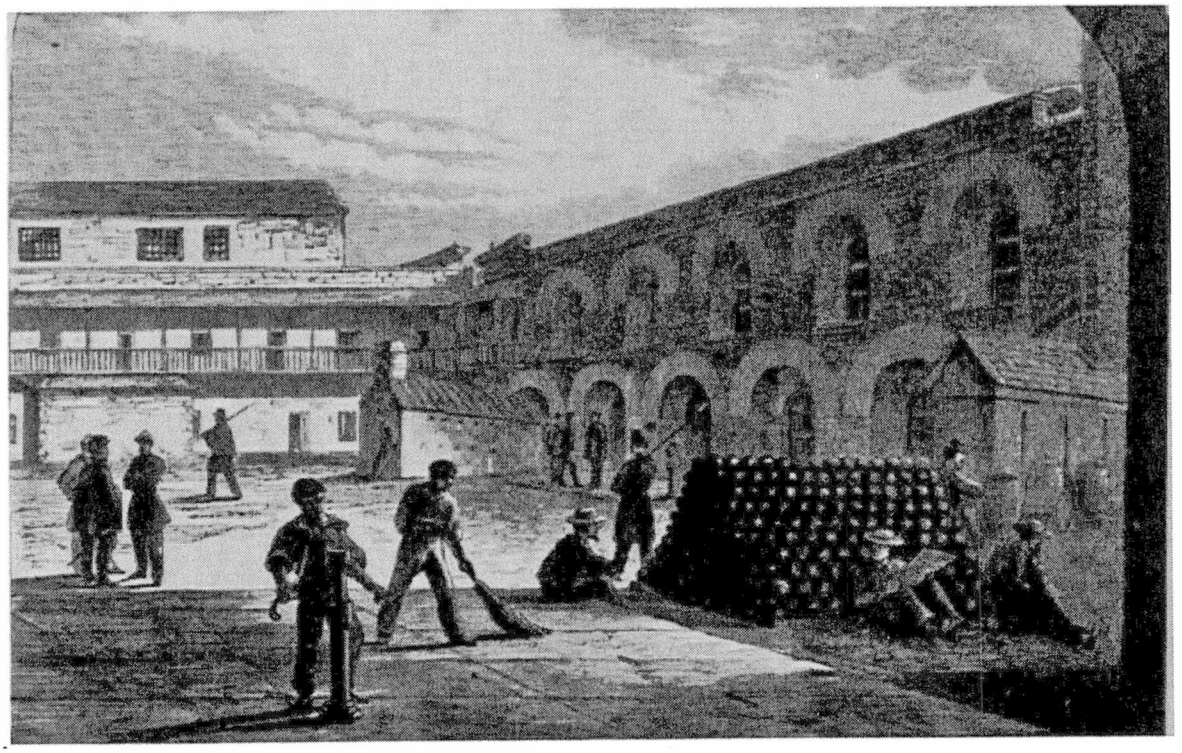
In immediate charge of the Fort Lafayette prisoners was Lt. Charles 0. Wood, described as "brutal" by many of the prisoners. He had been a baggage handler on the Ohio and Mississippi Railroad before the war and it was said he received his commission from President Lincoln as a reward for successfully smuggling Lincoln's baggage through Baltimore before his inauguration.

Originally, the fort was believed capable of holding up to 50 POWs. From the beginning, however, 20 were held in each gun casemate, with nine to ten in each land front casemate. Before the war ended there were often 35 to a gun casemate and up to 30 in a lower-tier casemate.

Captured blockade runners, initially imprisoned in the Tombs in Manhattan (New York City's civil prison), were transferred and kept in shackles, confined both day and night in the lower casemates of the fort. However, regular prisoners of war and political prisoners were allowed to exercise in the open area of the compound twice each day-from six to seven a.m. and from five to six p.m. This usually meant simply walking along the pavement around the inside of the fort several times. As the prison became more crowded, these walks were limited to one half hour twice a day and then, finally, eliminated altogether. At dark, the prisoners were confined to their rooms and all candles were extinguished



Political prisoners arriving at Fort Lafayette. *Author's Collection*



Fort Lafayette's parade ground during the Civil War. *London Illustrated News*



Confederate prisoners in one of Fort Lafayette's land-front casemates. *London Illustrated News*

at nine. Later, candles were also eliminated and, according to one prisoner's account, "the night to us now is nearly 15 hours, counting from lock-up time to the opening of the cell in the morning."

Kitchen facilities were also bad; meals were often served only half-cooked. For those who could afford it, there was also a mess under control of the fort's ordnance sergeant and his family. For these meals, prisoners were charged one dollar per day, credited against what the prisoners had turned over to Lieutenant Wood when they arrived at the fort. They were denied the use of their own funds to make food purchases from a sutler outside the fort or to receive food sent by friends, thereby eliminating all competition with the ordnance sergeant's service. "Dinners," complained one prisoner, "consisted of fat pork and beans, a cup of thin soup and bread, or of boiled beef, potatoes and bread on alternate days.... The coffee was a muddy liquid in which the taste of coffee was barely perceptible, the predominating flavor being a combination of burnt beans and foul water."

The fort's water was indeed foul. The prisoners often complained that the cistern contained dirt and "animalcules." There were also several periods during which prisoners had to go without water altogether. The health of the prisoners in Union hands has remained a matter of controversy. Although official records show only two deaths at Fort Lafayette during its use as a prison, prior to July 7, 1862, there was no War Department requirement to report such matters or keep records. Contemporary sources present a picture different from official records. Newspapers reported that a typhoid fever epidemic at the fort in late 1861 caused prisoners to die so rapidly "as to arouse public attention and produce an outcry of indignation."(125)

There were still 40 prisoners at Fort Lafayette as late as October 1865. By November, most of the POWs were released, but a number of political prisoners continued to be held. The last four were released in the ensuing months, one in January 1, 1866, two the following February, and the last one in March, making this facility the last major Union prison to hold wartime prisoners.

Fire Destroys Fort Lafayette

The last of the prisoners had been gone for only a short time before the engineers returned to make necessary repairs and begin the conversion of the fort back to its primary mission of seacoast defense. Repairs had been progressing for some two years when catastrophe struck. Workmen had finally undertaken some of the repairs the upper-tier roof had needed since before the war. On December 1, 1868, carpenters were making roof repairs. As a reporter for the *New York Times* noted:(126)

> Owing to the extreme coldness of the weather, they lighted a fire, and the sparks from the chimney fell upon the shingles of the roof of a temporary building, inside the fort, close to the casemates. No sooner had the first shingle caught than the flames began to spread, and in about three minutes there was a flame occupying a circle of about twenty feet, continuing to extend each way.
>
> The workmen, seeing that there was danger, immediately set to work to remove their tools and tool-chests; but before they had dragged them far they felt the necessity of making their escape without their tools, and at this point they realized the awful fact that they were hemmed in so as to render escape by any ordinary exit impossible. In this plight they had to extemporize means of being let down over the outer wall, and by that means they escaped, leaving the flames to gather strength and to extend with fearful rapidity without let or hindrance. So far as could be ascertained there were but two soldiers in the fort and one woman in charge.
>
> It is usual at this season of the year to keep no greater force than this in that fort, the main force being in Fort Hamilton. This slender garrison escaped as soon as possible thereafter, the Metropolitan police boat under the command of Captain Hartt, made its appearance off the fort, and in a short time a powerful stream of water was directed upon the burning and defenseless defense of New York Harbor, but to little purpose, for the strong northwest wind that blew at this time dissipated the water into spray almost as soon as it left the nozzle of the hose on board the boat.
>
> Two tug boats came to the aid of the Police boat, one of which sent another powerful stream toward the burning pile, but to as little purpose as the first one; the second tugboat got aground and the crew exhausted their energies getting back into deep water, and in a short time, owing to the imminent danger of explosion, all the boats left. This course was adopted more particularly because their efforts in throwing water were of so little consequence. Their good intentions not being enough, they left with their best wishes. Thus abandoned, the immense quantity of timber in the fort continued to burn with vigor. The leaving of the boats and the continuance of the fire began to be a subject of comment in the neighborhood. It began to be rumored that from fifty to sixty tons of powder were in the magazines and that this immense charge was in danger of exploding any moment should the flame reach it; and this danger was asserted to be certain. This danger gained additional credence by an officer, name not known, coming from the direction of the fort, and exclaiming "We'll all be in hell in twenty minutes."
>
> . . . Fort Hamilton is under the command of Major Madier. Fort Lafayette was in charge of a corporal's guard, detailed daily. The family of Mr. Church who reside on the bluff which commands a view of the harbor at that point, is about the only one having the temerity to brave all the dangers. They did not leave, and Mr. Church stated that he intended to remain and take his chances. As we left the scene at nearly 11 o'clock last night, the conflagration was still in progress, illuminating the whole region for miles, and constituting a terrible beacon to ships inward bound. The tall and stately flagstaff which stood in the center of the fort yard was, as we left the scene behind us, a column of fire, its flame paying such veritable pranks as were incited by the wind which was still lowing fresh. We were assured that all danger of the magazine exploding was over, and that, instead of fifty or sixty tons of powder being in store, there were about ten tons or less.

Fort Lafayette was left a gutted ruin, the 80 obsolescent seacoast guns in the fort ruined. Although the site of the fort was considered the "best of all positions for the defenses of New York Harbor," the decision not to repair the fort was based upon the presence of the much stronger and more heavily armed Fort Hamilton. The Board of Engineers projected plans in 1875 for construction of an entirely new casemated fort on Hendricks Reef to be armed with thirteen 80-to-100-ton guns behind iron shields. The project would incorporate a portion of the old work for use as bombproof quarters, storerooms, etc, at an estimated cost of $784,212. The Engineer Department recommended funding the project and requested an initial allocation of $200,000 to begin work. The Board of Engineers developed a second project in December 1884 for two wrought-iron turrets, with the necessary quarters, magazines, engines, boilers, etc., to occupy the same site. No funds were forthcoming for either project. The gutted ruins of Fort Lafayette were cleaned up and a portion of the old fort used for storage well into the 20th century. Fort Lafayette stood until the eastern pedestal of the Verrazano-Narrows Bridge was built on the old fort's site in 1960.(127)

Steam-powered warships created new defensive problems for the army in the 1840s. No longer could the defenders count on adverse tides or winds to impede hostile vessels. A narrow channel no longer formed the obstacle it had in the days of sail. Further, steam-powered vessels drew less water than sail-powered warships and their armament, while considerably reduced in numbers, was far more powerful. The guns of Forts Richmond, Lafayette, and Hamilton, while once a potent deterrent, were no longer considered powerful enough to prevent an enemy fleet running by into the inner harbor.

Staten Island's Supplementary Batteries

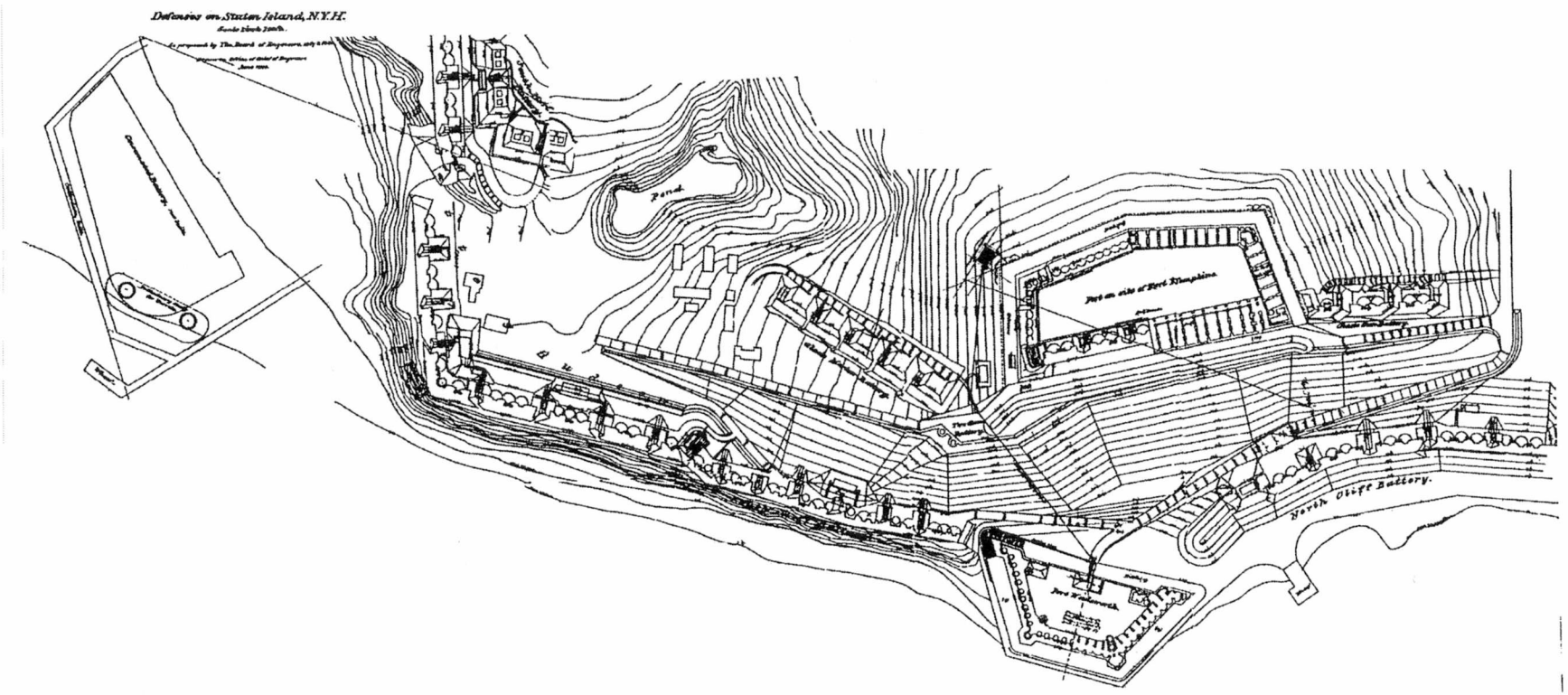
As Fort Richmond neared completion in 1858 and the replacement for Fort Tompkins on the crest of Signal Hill was beginning, planning an increase in the weight of armament along the Staten Island shore of the Narrows was also being completed. Between 1860 and 1876, six additional batteries would be added to the Staten Island defenses, to be eventually arranged for an additional 96 guns.

The Casemated Gun Battery

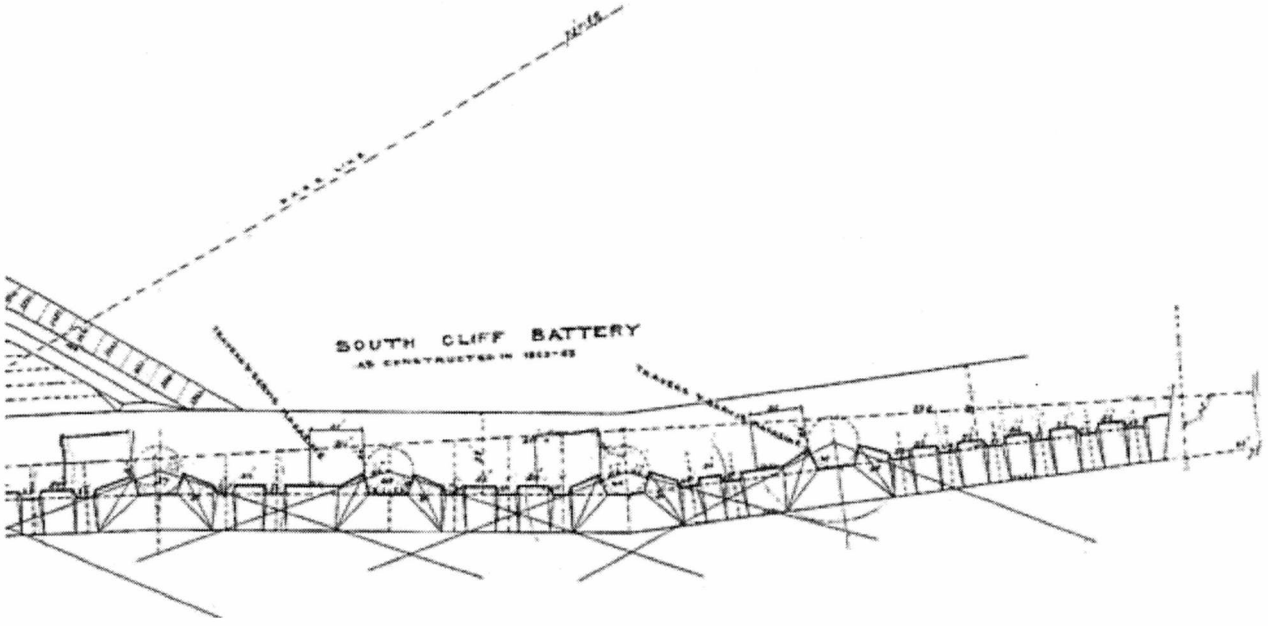
By 1860, plans were completed for a massive casemated gun battery on the shoreline immediately below Battery Hudson's south angle. The Board of Engineers considered this proposed battery the "most important work yet undertaken for the defense of New York." In his 1861 annual report, the chief of engineers requested $100,000 to commence this defense. No funding was provided, however, and the project was eventually suspended. The proposed site of the casemated battery was selected several years later as the preliminary location for a pair of turret batteries. Like the casemated battery, the turrets never progressed beyond the drawing board.

South Cliff Battery

The first supplementary battery to be built was South Cliff Battery, begun about 1858. Although the southern end of the battery was generally complete by 1861, work continued through the Civil War. By 1865, the north end of the battery was finished and a road had been built behind the battery from Signal Hill down to Fort Wadsworth. The principal magazine at the south end of the battery was built into the east slope of Signal Hill, directly south of Fort Richmond. The earthen barbette battery and its magazine were originally planned for thirty-one 10-inch Rodman smoothbore guns to supplement the fire of Forts Tompkins and Richmond and Battery Hudson. Later, a number of the platforms were armed with 200 and 300-pounder Parrott rifled guns.(128)



The primary forts and their ancillary batteries as developed by the 1880s. Left to right: The casemated battery with its proposed turrets; the adjacent Battery Hudson Extension and its mortar battery; Battery Hudson proper; the South Cliff Battery; Fort Wadsworth; and the North Cliff Battery with Fort Tompkins in the rear. *NARA*



Layout of South Cliff Battery as built 1858-65. *NARA*

The slopes were regraded in the late 1860s and a new magazine built in 1867. New plans developed in 1869 called for modifying the battery for 15-inch Rodmans. In 1873, 22 guns were emplaced in the battery. The plan called for constructing four new traverses, two of which would have magazines, and modifying two existing traverse magazines. These changes required a reduction in the number of gun platforms. Work was delayed on the modifications, however, pending the completion of Fort Tompkins' channel front and the extension of Battery Hudson. The battery was provided with principal magazines at its northern and southern ends in FY 1874-1875 and two service magazines were built near the battery's mid-point. Because of ordnance shortages, the South Cliff Battery never received its full complement of guns.(129)

In 1875, work began on part of the alterations to the battery. A new traverse magazine with covered passage near the north battery and a solid traverse were constructed; five gun platforms were taken up preparatory to constructing two other traverses. Covered passages were added to the two old traverse magazines near the center of the battery and their earth covering was increased. Some work was done to close up old entries to a principal magazine and build a new one accessed from the covered passage at the rear of the magazine. Before any additional work could be done, funding was suspended in 1876 and no improvements were made to the south portion of the battery that still had seven guns in place.(130)

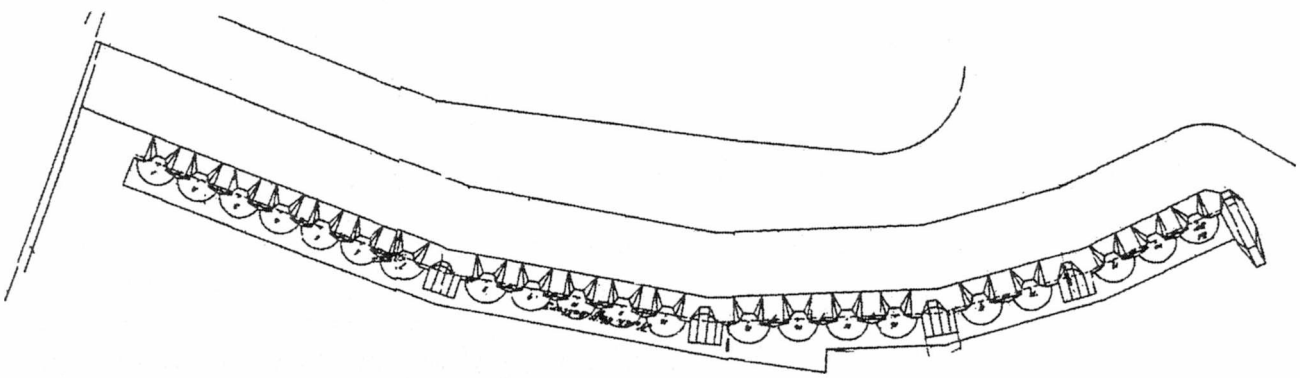
Over the next 10 years, the battery was preserved in its arrested state of modification. In 1885, eleven 5-inch pintles and the south principal magazine were refurbished. The project was again suspended with four other traverses and a traverse magazine remaining to be constructed, as well as a rubble seawall at the foot of the exterior slope of the parapet. In addition, the principal magazines had yet to be lined with timber, and the parapet had to be thickened.(131)

In the 1890s and early 1900s, South Cliff Battery was again rebuilt, this time to accommodate eight 3-inch (15-pounder) rapid-fire guns. It was then redesignated Batteries Bacon and Turnbull.

North Cliff Battery

On the slopes of Signal Hill north of Fort Richmond, this earthen barbette battery was initially planned for about twenty-one 8 and 10-inch Rodman guns to supplement the direct fire of Fort Tompkins and Fort Richmond. Construction began in 1862 and continued haltingly through the Civil War, but was still incomplete at the end of the war.

Like South Cliff Battery, the work was to be provided with storage magazines at the northern and southern ends of the battery, a large bombproof personnel shelter, and five traverses, two containing service magazines, separating groups of gun platforms. A parados at the south end of the battery protected the guns from enfilade fire and contained a bombproof shelter. The north storage magazine was completed in 1868 and the south storage magazine was begun in the South Parados. Before the battery could be completed and its armament mounted, plans were modified in 1870.(132)

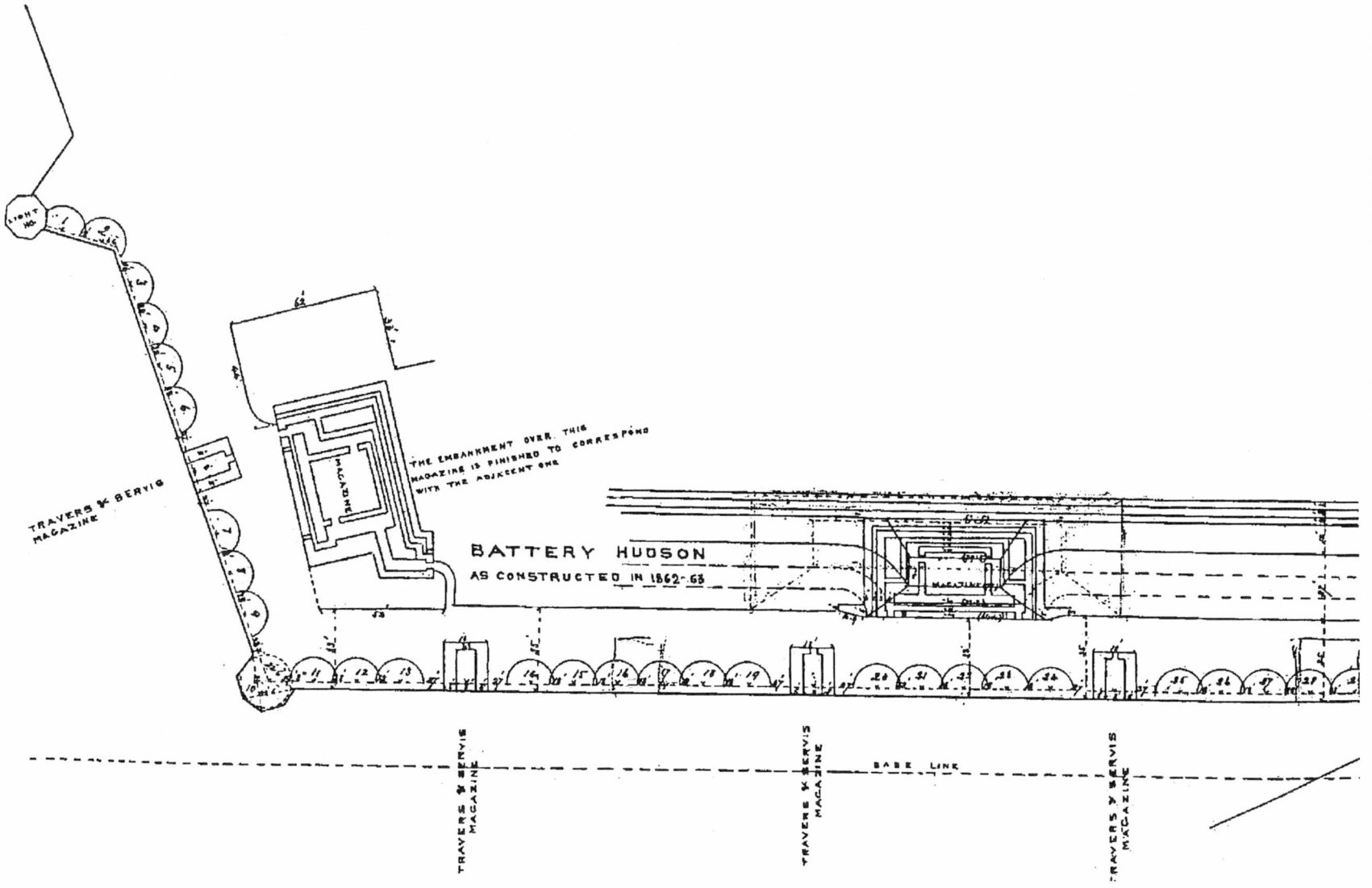


North Cliff Battery as originally designed in 1862. *NARA*



Entrance to one of the 1870s-Project traverse magazines. *Author*

These modifications called for eliminating the large bombproof, changing the projected armament to a dozen 15-inch Rodmans, and increasing the number of traverses separating the guns. In 1873, six Rodmans were mounted and six more awaited emplacement. From 1871 until work was suspended in 1875, two earth-and-concrete principal magazines were built, as well as two traverse service magazines. A passage through the solid traverse was cut and provided with a stone passageway and wing walls. Four concrete foundations for the six-gun battery were laid and their timber gun platforms put in place. When reconstruction was suspended in 1875, a considerable amount of work remained: Replacing wooden gun platforms with concrete, constructing stone breastheight walls in front of each pair of emplacements, adding concrete bonnets to the two service magazines in the traverses, lining the principal magazines with timber, increasing the thickness of the



Battery Hudson and its Return as built, 1862-65. *NARA*

parapet; and constructing a seawall and rip-rap at the foot of the parapet's exterior slope. In the early 1900s, emplacements for six 3-inch RF guns were built here and named Battery Catlin.(133)

Battery Hudson

This battery, originally dating back to the early 1800s, underwent considerable reconstruction in the 1840s, with additional improvements in the 1850s. It was in good condition at the beginning of the Civil War, and during the war, its 8 and 10-inch columbiads were partially replaced by newly developed 200 and 300-pounder rifled Parrott guns. Beyond maintaining the battery in good order, nothing more of import was done during the war and the battery was a major element of the defenses of the Narrows, but as the conflict wound down in 1865, Battery Hudson was included with the proposed improvements for the North and South Cliff Batteries. Because it was already a powerful battery, work on the cliff batteries was deferred until Battery Hudson could be nearly complete. As part of the tests to determine the effect of "modern" artillery, an experimental casemate was constructed near the south end of the battery as a target.

In 1867, the old shot furnaces were removed from the terreplein and in the following years, leaks in the roofs of the storage magazine were repaired. The intense rainstorms of 1869 caused the entire rear slope of Battery Hudson to slide down onto the terreplein. This necessitated re-grading of slope and removing the upper portion of Battery Hudson. Repairs were undertaken at considerable expense, including rebuilding the slope on a gentler grade. In addition, the two storage magazines were lined with wood.

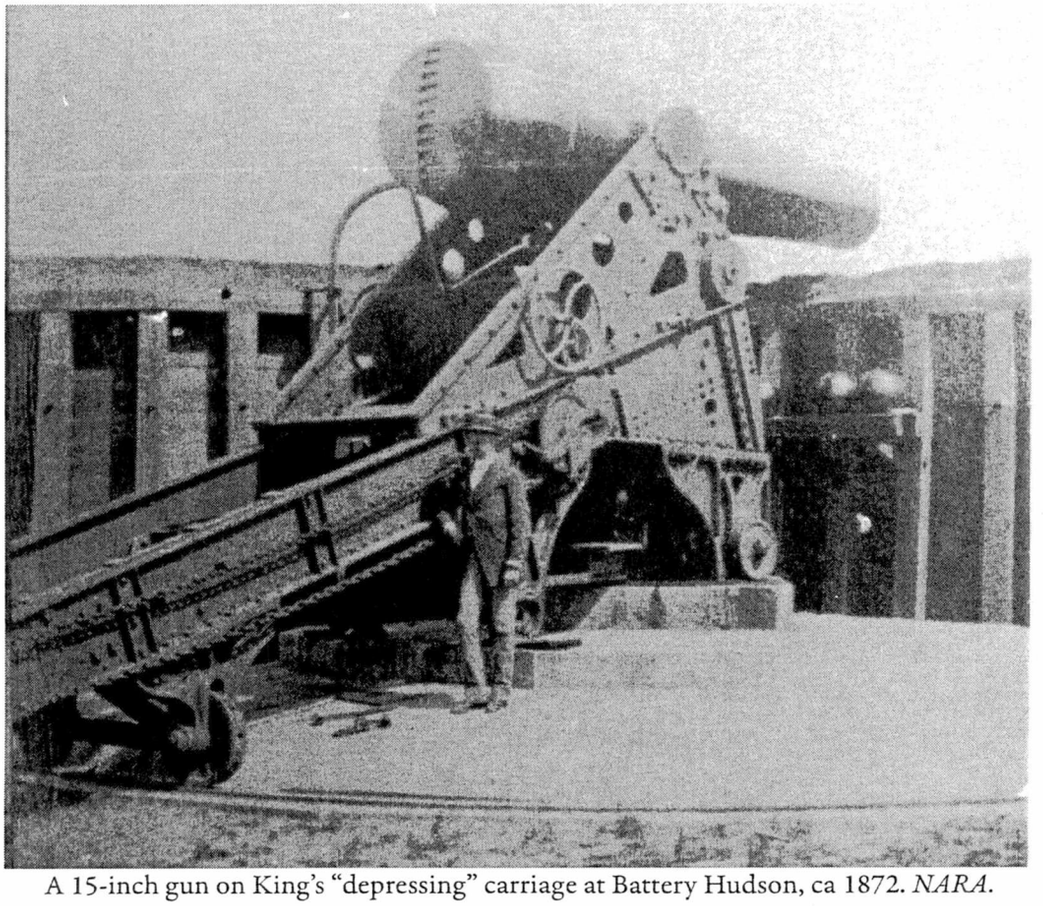


Remains of Battery Hudson's Parrott-gun platforms, ca 1860s. *Author*

New plans were approved to modify the older part of Battery Hudson and add an earthen extension with traverses and platforms for heavy 15-inch Rodman guns west of the battery terminus, designated the Battery Hudson Extension. In addition, a reserve magazine was projected for the Extension.

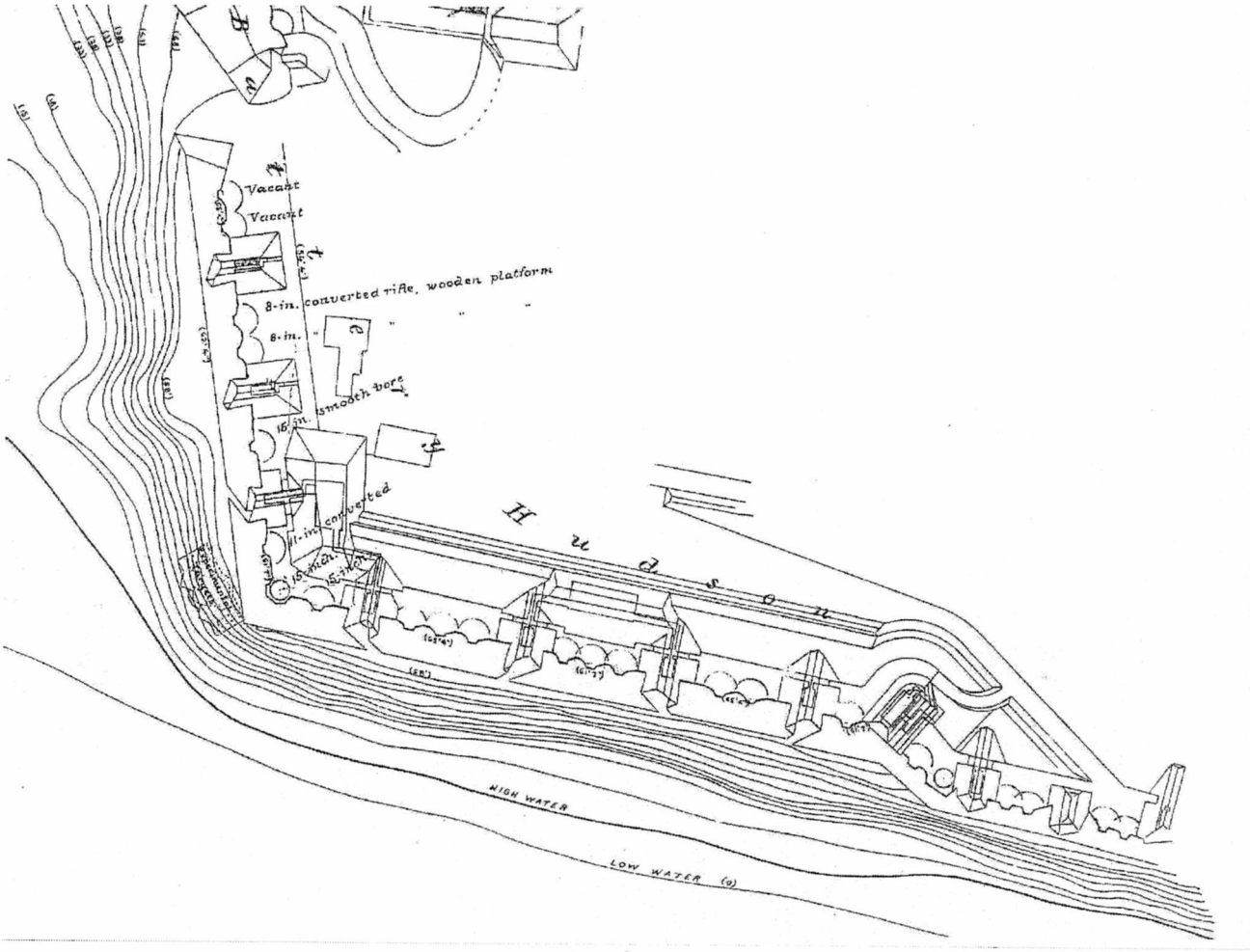
In 1870, a dry stone wall was laid over the arch of the experimental casemate and in front of the center-pintle platform for the 15-inch Rodman; the space between them was filled with earth to secure the foundation of the platform. In 1871, most of the work was concentrated on the west return of Battery Hudson, where two service magazines were built except for their doors, earthen covering, and the wing-wall coping. This area west of the center-pintle Rodman platform was cleared to make room for more 15-inch Rodman platforms. In the Battery Hudson Extension, the masonry for two more service magazines and a principal magazine was complete except for the wing wall coping. Their earth coverings were well advanced and nearly ready to be sodded.(134)

Progress on that part of the battery extension bearing on the lower bay was delayed by slowness creosoting the timber Rodman platforms in the battery's west return. This was partially due to the inconvenience of working around the platform of the King's counterpoise carriage under construction and the experimental firing that followed. The wing walls of the two traverse magazines were finally completed and covered with earth, but not sodded. The lighthouse in the west return of the battery was removed late in 1873. Capt. William R. King initially set a 15-inch gun on his "depressing" carriage at Fort Foote, MD, on the Potomac River and began experiments in February 1869. During the first trial, he fired 22 rounds from the 15-inch gun. After two more firing sessions at Fort Foote, King moved his experiments to Battery Hudson in 1871 because of the problems clearing the Potomac River before shooting and the limited field of fire. Three additional firings were held by King at Battery Hudson between August 1871 and January 1873. In general, the officers of the 1st Artillery who participated were favorable impressed with the carriage, as were the various boards of general officers who observed the firing trials.(135)



A 15-inch gun on King's "depressing" carriage at Battery Hudson, ca 1872. *NARA.*

In 1872, the principal magazine of the battery extension was sodded. The two traverse magazines were covered with earth but not sodded. The terreplein was graded and a cottage in the rear of the extension was removed. This work continued into 1873, when the earth was regraded to gentler slopes and preparations were made to lay five wooden platforms.



Battery Hudson and its return, ca 1870. *NARA*

While work was being advanced on the west return of Battery Hudson and the Extension, plans were underway to modify much of the old east front of the battery for 15-inch Rodmans. Some 16 platforms mounting 10-inch columbiads and 200 and 300-pounder Parrott rifles were to be replaced by nine 15-inch Rodmans, separated by traverses. In 1873, three 10-inch columbiads were dismounted from the east front and their platforms removed. Six permanent platforms of stone and concrete were laid on the east front and an arched passage south of the north principal magazine was finished. In 1874, six more guns and platforms were removed and the breastheight wall was rebuilt to accommodate five permanent Rodman front-pintle platforms with low traverse rails. Nine more timber platforms with high traverse rails were laid, four in the west return of the battery and five in the Extension, where the breastheight wall was temporarily revetted with sod.

In 1875 and 1876, work on Battery Hudson continued until funding was exhausted. The earthen covers and sodding of the northern and southern principal magazines on the battery's east front were finished and the concrete floors of the covered passages to their new entrances were poured. The

modification of the armament on the east front continued. Seven 200-pounder Parrott rifles were dismounted and their 10-inch gun platforms and breastheight walls taken up. A new traverse magazine was completed near the north end of the battery and the foundations for two new permanent gun platforms laid. In the Battery Hudson Extension, 12 platforms were ready for their armament and 10 more were being altered. Six 300-pounder Parrotts had not been replaced with three permanent platforms for 15-inch Rodmans when funding ran out.

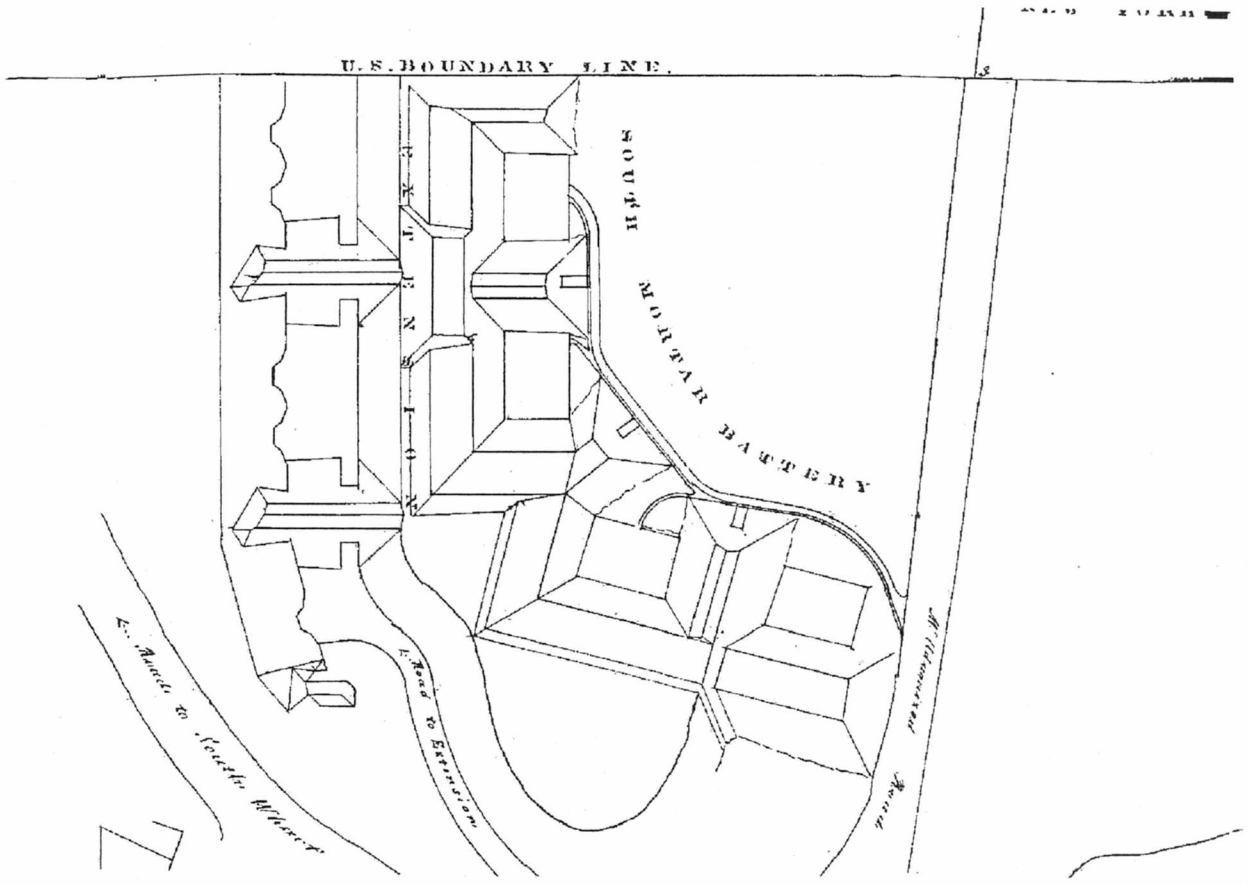


Traverse in Battery Hudson. *Author*

Using the small amount remaining from previous appropriations, the parapet of the Battery Hudson Extension was roughly formed and the outer traverse rails for five 15-inch Rodman platforms were laid. On the east front of the main battery, parapets were strengthened and outer traverse rails were placed for permanent Rodman Platforms Nos. 2 and 3. When work was suspended, it was estimated that an additional $36,200 would be required to complete the modifications to the main battery, its return and extension.(136)

South Mortar Battery 1872-1875

In the rear of Battery Hudson Extension, this earthwork battery and its masonry magazine was commenced in 1872 and nearly completed in 1873. The battery was for ten 13-inch seacoast mortars on timber platforms laid on concrete foundations. In 1874, the battery was ready for its armament, except for laying the timber platforms and hanging the two inner doors in the magazine. Each pair of mortars was to be enclosed within a high earthen parapet on three sides, leaving the rear open to the service the weapons from the magazines in the traverses between the mortar platforms. The project was suspended in 1875 before completion, and emplacements for only eight of the projected ten mortars were completed.(137)



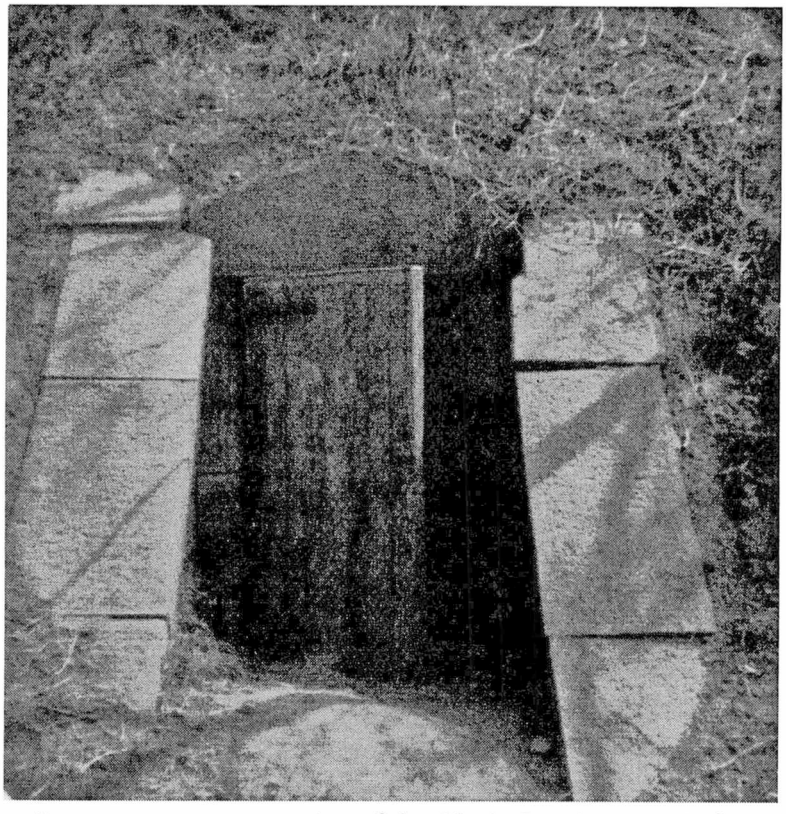
Detail of Battery Hudson Extension and South Mortar Battery. *NARA*

Glacis Gun Battery

A barbette battery for five smoothbore 15-inch Rodman guns on high-traverse front-pintle carriages was sited on the north glacis of Fort Tompkins to supplement the fire of the fort's channel front. Begun in 1872, it was provided with three traverses, two containing service magazines. The oak gun platforms were laid on concrete foundations. At the end of 1872, it was estimated that a single month's work would have the battery ready for its armament. The remaining work consisted of hanging the magazine doors and completing the lamp closets, building the breastheight walls, and laying the timber gun platforms. By 1873, it was ready for its armament. In 1875, the inner grated magazine doors were hung and the grass mowed. In 1877, the cost to substitute stone for the timber gun platforms was estimated at $9,000. As far as is known, no guns were ever mounted in the battery and the platforms were rotting by 1882. Estimates to complete the battery, in addition to the completion of the magazines, required increasing the height of the breastheight wall, had risen to $15,000 by 1885.(138)

Glacis Mortar Battery

This ancillary battery of Fort Tompkins was constructed on the south glacis of the fort in 1872 and 1873 for five pairs of 13-inch smoothbore seacoast mortars on oak platforms, separated by earthen traverses, two of which contained service magazines. The left-most pair of mortar platforms was demolished when Battery Duane was constructed. By the end of 1901, the battery was vacant and the wooden platforms were unserviceable.



Entry to traverse magazine of the Glacis Gun Battery. *Author*

Two Gun Battery

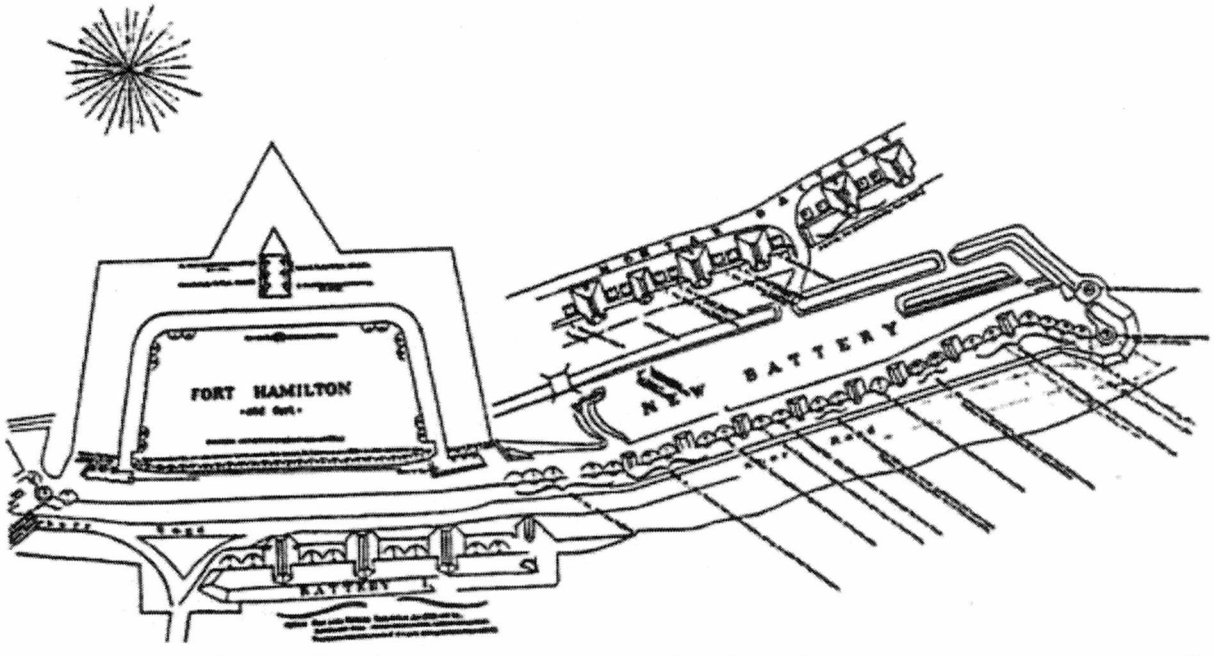
Begun in 1865, this small barbette battery near the angle in the southeast coverface of Fort Tompkins was for two 10-inch Rodman guns on center-pintle stone platforms. No magazine was provided for the battery, and it is doubtful the guns were ever mounted.

Detached Exterior Barbette Batteries at Fort Hamilton

In 1859, funds were requested for two small, detached exterior earthen batteries at Fort Hamilton, each for three guns on barbette carriages. Funding and construction commenced in 1860, but progressed slowly. One battery, for two guns on front-pintle and one on a center-pintle platform, was adjacent to the northeast covered way of the fort. The other three platforms for front-pintle barbette guns were adjacent to the south covered way. The Civil War, however, slowed construction of these exterior batteries, and they were not completed until after the war.(139)

New 15-inch Gun Battery

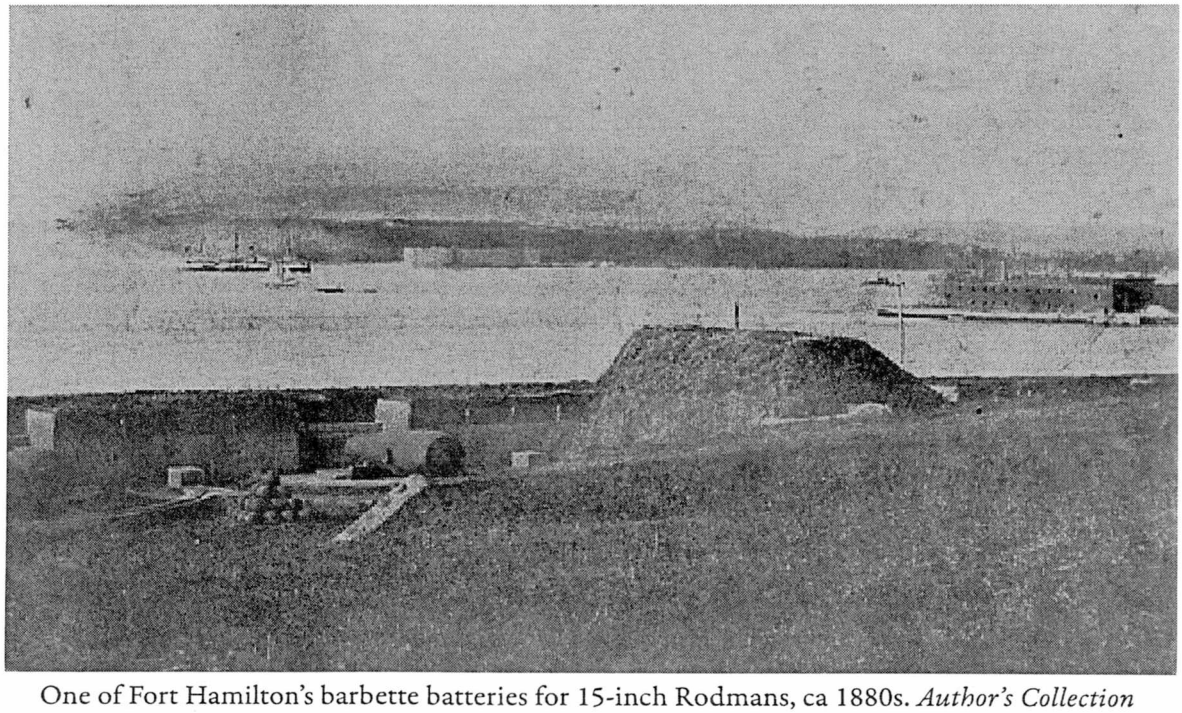
The third Civil War-period battery was begun in 1863 along the shoreline above the Shore Road south of the fort. This open barbette battery was initially arranged for nineteen 15-inch Rodman guns on iron front-pintle barbette carriages. At the far south end of the battery, emplacements for two 15-inch Rodmans on center-pintle carriages covered Gravesend Bay. The battery was extensively modified following the Civil War and eight traverse magazines were constructed, separating pairs of gun platforms. In the late 1860s, two storage magazines were built into the high earthen bank behind the battery, one at the north and one at the south end of the battery. The battery was essentially ready for



Fort Hamilton and its ancillary batteries as they appeared in the early 1890s, prior to construction of Endicott-Era batteries. *NARA*

service at the end of 1867, although the engineers continued to make small improvements and modifications into the 1870s.

An additional center-pintle platform for a 15-inch Rodman was added along with a ninth traverse magazine. In 1874, the 5-inch pintles for the 15-inch Rodman platforms were replaced with 6-inch pintles. By the mid 1880s, the battery was armed with one 20-inch Rodman gun, twenty-three 15-inch Rodmans (three on center-pintle and 20 on front-pintle platforms), in addition to one 11-inch and two 8-inch converted rifles.(140)



One of Fort Hamilton's barbette batteries for 15-inch Rodmans, ca 1880s. *Author's Collection*

Barbette Battery No. 1

An allotment of $25,000 was made to begin a new exterior barbette battery. Designed by the Board of Engineers in 1870 for eight 15-inch Rodman guns or equivalent rifles, it was at the water's edge in front of Fort Hamilton. The initial work by Lt. Col. John Newton of the engineers required a cofferdam 484 feet long and 83 feet offshore. Piles were driven and timbers spiked, forming a grillage for the battery foundation. A stone seawall about 10 feet high was built, with a coping along its top course. The seawall was backfilled with earth to within 2 feet of the top of the wall. Designated Battery No. 1, it stood directly in front of Fort Hamilton's channel front adjacent to the fort's wharf, and was generally complete by 1874, with eight emplacements for 15-inch Rodmans on front-pintle mounts. Pairs of gun platforms were separated by traverse magazines, with a magazine at the south end of the battery. After a few years, however, the pressure of the earth threw the seawall slightly out of alignment and required buttressing by a slope of rip-rap stone.(141)

Mortar Battery

Once Battery No. 1 was well underway, Colonel Newton commenced work on the second battery projected for Fort Hamilton. In 1870, the Board of Engineers had designed a battery for fifteen 13-inch seacoast mortars, initially to be built behind the 15-inch battery. After some slight changes in its layout and location, reducing it to 13 mortars behind a continuous parapet, construction finally commenced in 1871. Six earthen traverses, three containing magazines, separated the pairs of mortar platforms. A large traverse closed off the east end of the battery and protected against flanking fire. The concrete foundation of the mortar platforms was being poured and the timber mortar platforms were being laid when funds were exhausted in 1876, with only 12 wooden platforms set in place. No further appropriations were made for continuing the project. Four 13-inch seacoast mortars on iron carriages were eventually mounted on timber Platforms 1, 2, 3, and 4 (from east to west); the other platforms remained unarmed.

The Board of Engineers' 1870 project had also proposed an extension, or return, for the new 15-inch gun battery, designating this Battery No. 2. In addition it planned a detached battery, designated Battery No. 3, to be substituted for the former, provided the land needed could be purchased by the government. Neither battery was commenced.(142)

Fort Hamilton and Its Batteries Fall into Disrepair

Beyond the most-minor maintenance, no work was done to the defenses on the Long Island side of the Narrows in the decade after 1876. By the early 1880s, the earthen slopes of the 15-inch battery were eroding and the masonry of the fort was failing in several places. Leaks were increasing and the parade wall of the channel front was separating from the arches of the casemates. Repairs were carried out with the small allocations from the Engineer Department's Contingencies for Fortifications Appropriation.(143)

The Regulars Return 1865

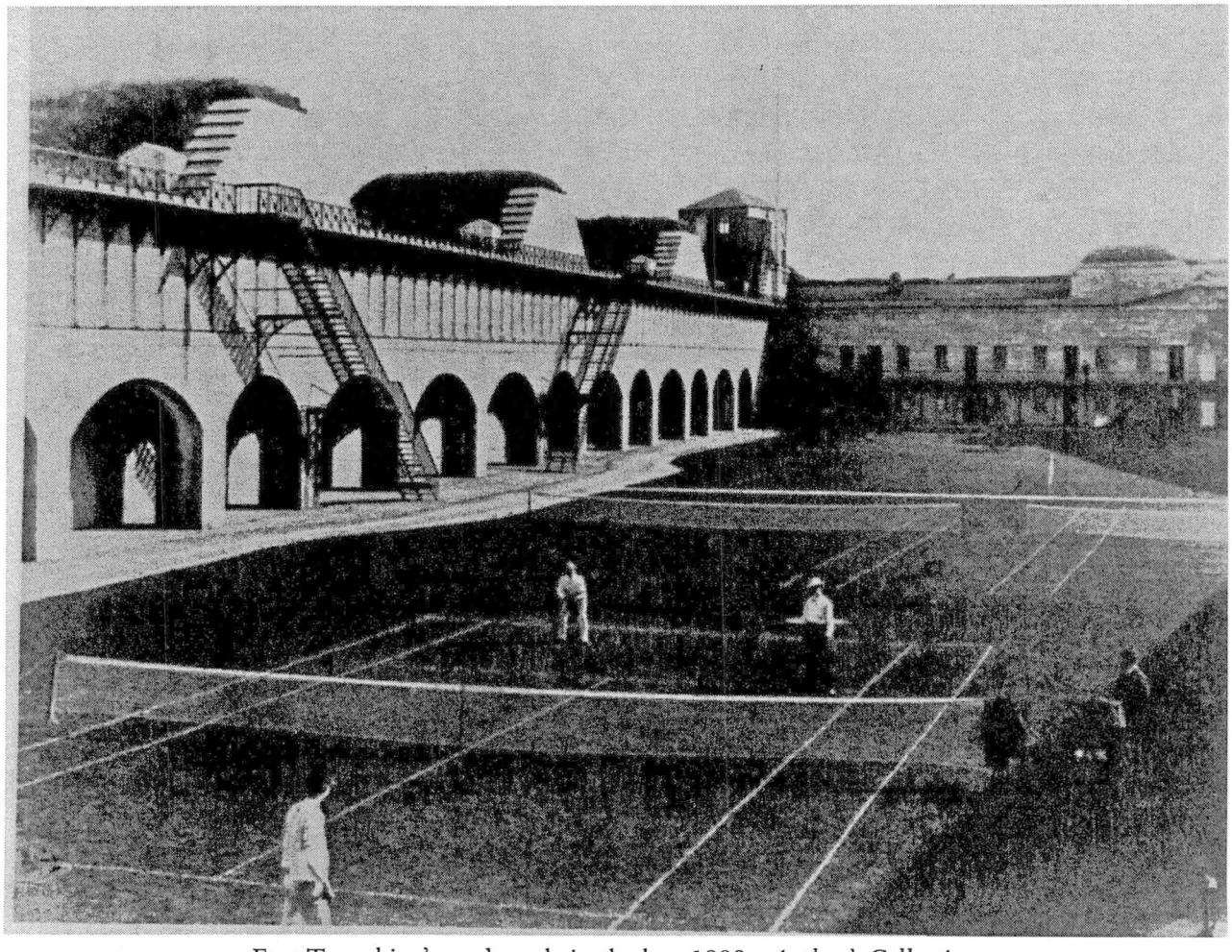
Elements of the 12th US Infantry Regiment returned to Fort Hamilton in November 1864. At the end of the war, the fort was manned by elements of the 1st US Artillery Regiment, who remained until November 1871. The 1st Artillery had been largely posted in the South during the war. However, its field grade officers had been assigned to command functions elsewhere. Col. Justin Dimick had initially maintained regimental headquarters at Fort Warren, in Boston Harbor, but in August 1863

he retired, to be succeeded by the regiment's senior captain, William Silvey, who established his headquarters at Concord, NH, until January 18, 1865, when it was moved to Fort Hamilton.(144)

With the end of the war, all but two of the regiment's batteries were dismounted. The field officers of the regiment who had temporarily held higher ranks while on detached service returned to the regiment, which resumed the regular routine of garrison life. Batteries I and K remained light batteries and went to Fort Brown, TX. The remaining batteries were reassigned to the seacoast forts. Batteries F and G were stationed along the New England Coast, and Batteries A, B, C, D, E, H, L, and M were assigned to forts at New York - Batteries H and L at Fort Schuyler; Batteries A, E, and M at Fort Wadsworth; and Batteries B and D at Fort Hamilton. Battery C was posted at Fort Lafayette.(145)

On January 17, 1866, Battery B was moved across the Narrows to Fort Wadsworth and on May 6, Battery A departed for Fort Trumbull, CT. In the next month, the usual garrison duties were disrupted when most of the regiment was moved to secure the northern New York border in connection with the Fenian raids into Canada. Detachments from Fort Hamilton were also called on in the late 1860s and early 1870s to protect internal revenue officers in their search for illicit whiskey in the Brooklyn slums.

By 1867, the number of batteries manning the works at the Narrows had been reduced to four. Battery B was posted at Fort Wadsworth, while Battery C occupied Fort Lafayette and Batteries D and M garrisoned Fort Hamilton. In May 1868, Battery C moved out of Fort Lafayette to Fort Hamilton



Fort Tompkins' quadrangle in the late 1880s. *Author's Collection*

to enable the engineers to undertake the long-needed repairs to that venerable work. In 1869, Fort Hamilton's garrison was reduced to two companies when Battery D moved to Fort Wadsworth, while Battery E was shifted from Fort Schuyler, giving the Staten Island forts a three-battery garrison. Six regimental batteries were again deployed to the Canadian border for several days in May and June 1870 as a result of another Fenian outburst, leaving only Battery M to garrison the Narrows. In 1871, with repairs to Fort Hamilton completed, the Staten Island forts were again home to a single battery, B, while Batteries C, D, H, and M were quartered at Fort Hamilton.

In 1872, the 1st Artillery's tenure at the Narrows ended in November and the regiment was rotated to the South in stages. The 3rd Artillery arrived to replace it in the last days of November, beginning a posting that would last until November 1881.(146)

During the 1870s and early 1880s, the forts at the Narrows were typically manned by five or six of the twelve batteries of the 3rd Artillery. Typically, Batteries C, E, and G were posted at Fort Hamilton, and Batteries L and M at Fort Wadsworth. Regimental headquarters was at Fort Hamilton, but the batteries were shifted from fort to fort over the decade. One battery was sometimes stationed at Fort Wood in the Upper Harbor, while other batteries were stationed at forts in upstate New York and in Boston Harbor.

On November 15, 1881, headquarters and five batteries of the 5th Artillery arrived under Lt. Col. John Hamilton to relieve the 3rd Artillery, which departed for the Southeastern Coast. Batteries E, F, H, I, and M were posted at Fort Hamilton, while Battery B occupied Fort Wadsworth until 1884. The regiment was ordered to the West Coast in the spring of 1890 and by the end of the year was largely posted in San Francisco Harbor.(147)

Footnotes

1. John W. Barber and Henry Howe, *Historical Collections of the State of New York* (New York: S. Tuttle, 1842), pp. 473-74.
2. *History of Fort Wadsworth Tricentenary 1663-1963* (New York: Fort Wadsworth, 1963), pp. 4-5. Hereafter: *Fort Wadsworth Tricentenary.*
3. Louis Morris, *Military History of the Battery from the Dutch Settlement 1626 to the Razing of Fort George 1790*, NPS, 1963, pp. 35, 37. Copy in the author's collection. Hereafter: Morris, *Military History of the Battery.* Alan and Barbara Aimone, "Pre-Revolution Fortified Places in New York," *Periodical: Journal of the Council on Abandoned Military Posts*, in 4 parts, 60 and 61 (Fall, Winter, Spring, and Fall, 1977-78).
4. Mark Mayo Boatner III, *Encyclopedia of the American Revolution* (New York: McKay, 1966), pp. 454, 484. Hereafter: Boatner, *Encyclopedia of the American Revolution. Fort Wadsworth Tricentenary*, p. 3.
5. Before his appointment as governor of New York, Tryon served as Royal Governor of North Carolina colony 1764-71. Boatner, III, *Encyclopedia of the American Revolution*, p. 1126.
6. Hellgate was at the confluence of the Harlem and East Rivers in the passage between New York's Inner Harbor and the Head of Long Island Sound. Its rapids and treacherous currents were city's primary defenses against naval attack from Long Island Sound.
7. *Fort Wadsworth Tricentenary,* p. 5.
8. John Montresor (1736-1799) served as assistant engineer in the British Army, and in 1754 came to America with Maj. Gen. Edward Braddock. He served as an engineer in the British Army in North America between 1754-78. After the French & Indian War, he conducted a partial survey of the St. Lawrence River and built redoubts around British forts in Canada. In 1764, Montresor accompanied Col. John Bradstreet's expedition to Detroit as chief engineer and commander of a detachment of Canadian volunteers. He then returned to Canada and later worked on British fortifications in the present northeastern U.S., as well as helping establish the long-disputed boundary between New York and New Jersey. During the Revolutionary War, until his temporary retirement due

to poor health in 1778, he was the principal engineer of the British Army in America. Asa R. Runyon, *History of Fort Hamilton* (New York: Ft. Hamilton, 1928), p. 3. Hereafter: Runyon, *History*. Morris, *Military History of the Battery,* pp. 37, 40-41. For early fortification efforts on Staten Island, see also: Frederick R. Black, *Historic Resource Study: A History of Fort Wadsworth, New York Harbor* (Boston: NPS, 1983), pp. 21-25. Hereafter: Black, *History of Fort Wadsworth.*

9. Boatner, *Encyclopedia of the American Revolution*, pp. 795-96. Thomas Hoffman, *Fort Hancock* (Charleston, SC: Arcadia, 2007), p. 10. Hereafter: Hoffman, *Fort Hancock.*

10. Black, *History of Fort Wadsworth,* p. 5.

11. Signal Hill on Staten Island was the site of a signaling device more or less continually from about 1711 into the early 19th century to advise Manhattan of the arrival of shipping. Bedloe's, Oyster, and Governor's Islands were known collectively as the "Oyster Islands." James G. Wilson (ed.), *The Memorial History of the City of New-York* (New York: New-York History Co., *1892-93*), Vol. I, pp. 52-53. I.N. Phelps Stokes, *The Iconography of Manhattan Island 1498-1909* (New York: Robert H. Dodd, 1892-1928), Vol. IV, p. 1198. "Instructions to Charles Vincent acting as a temporary Engineer in the service of the United States," *American States Papers,* Series IV, Military Affairs, Vol. I, pp. p. 77. Hereafter: *ASPMA.* "General observations on the defense of the Harbor and City of New York by Mr. Vincent, New York, 1794," *ASPMA,* Vol. I, pp. 78-80.

12. "Memoire on the subject of fortifying the Port of New York...," by Bureaux Pusy, October 9, 1801, Document No. 1, *Buell Collection of Historical Documents Relating to the Corps of Engineers, 1801-1819*, NARA Microcopy Number 417. Hereafter Buell Document. Joseph Mangin, "Catalogue des plans du Project de Defense propose a Sandy Hook pour la protection de la...New York," Buell Document No. 3.

13. "A Project for Fortifying the Harbour of N. York from DeWitt Clinton," January 7, 1805, Buell Document No. 56.

14. H. Dearborn to Lt. Col. Jonathan Williams, September 20, 1805, Williams Papers, Lilly Library, Indiana Univ., Bloomington, IN, hereafter Williams Papers.

15. Buell Document No. 56.

16. R.S. Guernsey, *New York and Vicinity during the War of 1812-'15, Being a Military, Civic, and Financial Local History of that Period....* (New York: Charles L. Woodward, 1889), Vol. I, p. 63. Hereafter: Guernsey, *New York.*

17. Jonathan Williams to Selah Strong, Esq. July 29, 1807, Buell Document No. 117. Lewis W. Call, *United States Military Reservations, National Cemeteries and Military Parks, Title Jurisdiction, Etc.* Revised Ed. (GPO: 1907), p. 220. Hereafter: Call, *Reservations.*

18. Guernsey, *New York*, Vol. I, pp. 64-65. William Eustis to Jonathan Williams, May 4, 1808, Buell Document No. 164.

19. Guernsey, *New York*, Vol. I, p. 64. Call, *Reservations*, p. 220.

20. Jonathan Williams to William Eustis, October 15, 1808, Buell Document No. 182.

21. "Colonel Williams' Comprehensive Plan for the Defences at the Narrows, October 21, 1808," Daniel D. Tompkins, *Public Papers of Daniel D. Tompkins, Governor of New York, 1807-1817* (Albany: J.B. Lyon, 1902), Vol. III, pp. 138-45. Hereafter *Tompkins Papers.*

22. Daniel D. Tompkins to Thomas Jefferson, January 21, 1809, *Tompkins Papers*, Vol III, pp. 185-87. *New York Gazette and General Advertiser*, December 31, 1808, Vol. 5, p. 1499. "A History of Fort Hamilton, Brooklyn, New York," p. 7. This 18-page upublished work was written ca 1884 at Fort Hamilton and later placed in the Records of the Office of the Adjutant General, RG 94.

23. Daniel D. Tompkins to Thomas Jefferson, January 27, 1809, *Tompkins Papers*, Vol. III, pp. 185-86.

24. The Embargo Act of 1807 prohibited trade with all foreign countries, withdrawing nearly all American shipping from the seas. The 1807 Act was replaced with the Non-Intercourse Act of 1809, prohibiting trade only with Great Britain and France. De Witt Clinton *et al* to Daniel D. Tompkins, February 16, 1809, *Tompkins Papers*, Vol. III, pp. 207-10.

25. Daniel D. Tompkins to Jonathan Williams, January 6, 1810; Jonathan Williams to the Commission on Fortifications of the State of New York, January 18, 1810, Williams Papers.

26. "De Witt Clinton *et al* to Daniel D. Tompkins, February 16, 1809, *Tompkins Papers*, Vol. III, pp. 207-10. Richmond Country was named for Charles Lennox (1672–1723), the illegitimate son of Charles II. Lennox was created Duke of Richmond in 1675.

27. Jonathan Williams to the Commission on Fortifications of the State of New York, January 18, 1810, Williams Papers.

28. Ibid.

29. DeWitt Clinton *et al* to Daniel D. Tompkins, February 16, 1809, *Tompkins Papers*, Vol. III, pp. 207-10.

30. Fort Hudson was named for explorer Henry Hudson, Fort Morton for John Morton, signer of the Declaration of Independence, Matthew Adams (comp.), *Designating US Seacoast Fortifications* (Peoria, IL: Self, 2000), pp. 212, 217-18. Hereafter: Adams, *Designating US Seacoast Fortifications.* Ibid. The Glacis Mortar Battery built in the early 1870s is believed to have been constructed on the site of Battery Morton.

31. Jonathan Williams to the Commission on Fortifications of the State of New York, January 18, 1810, Williams Papers.

32. De Witt Clinton to Daniel D. Tompkins, February 26, 1811, *Tompkins Papers*, Vol. III, pp. 261-62. Report of Warlike Stores Belonging to the State of New York, February 27, 1811, *Tompkins Papers,* Vol. III, pp. 263.

33. Jonathan Williams to the Commission on Fortifications of the State of New York, January 18, 1810, Williams Papers.

34. Guernsey, *New York,* Vol. I, pp. 73-74, 76, 98-99.

35. Jonathan Williams to William Eustis, July 10, 1812, Buell Document No. 332. Jonathan Williams to James Madison, July 10, 1812, Buell Document No. 333. William Eustis to Jonathan Williams, July 27, 1812, Buell Document No. 431. Francis B. Heitman, *Historical Register and Dictionary of the United States Army from its Organization September 29, 1789, to March 2, 1903*, Vol. I (GPO: 1903), p. 226. Hereafter: Heitman, *Historical Register.*

36. Maj. George D. Bomford served as both an engineer and as an ordnance officer, on which duty he focused most of his skills during the War of 1812. George Washington Cullum, *Biographical Register of the Officers and Graduates of the U.S. Military Academy at West Point, N.Y., from its Establishment in 1802 to 1890, with the Early History of the United States Military Academy,* 3rd Ed. (Boston: Houghton Mifflin, 1891), Vol. I, pp. 58-59. Hereafter, Cullum, *Biographical Register.*

37. Guernsey, *New York,* Vol I, pp. 166-67, 172-75, 178-81.

38. Swift was a protégé of Williams and had worked frequently with the former chief engineer. Cullum, *Biographical Register*, Vol. I, pp. 51-56. Joseph G. Swift, *The Memoirs of General Joseph Gardner Swift, L.L.D., U.S.A., First Graduate of the United States Military Academy, West Point* (Worcester, MA: Privately published, 1890), pp. 103-04, 109-10. Hereafter: Swift, *Memoirs.*

39. Guernsey, *New York,* Vol. I, pp. 219, 301-02.

40. Jonathan Williams to the Commission on Fortifications of the State of New York, January 18, 1810, Williams Papers.

41. Guernsey, *New York*, Vol. I, p. 6. Although purchase of the Denyse farm was recommended, the initial land was not acquired until after the War of 1812.

42. Cutbush was employed in the field during the War of 1812 and then in the works around New York City. Following the war, he resigned his commission but continued fortification work around New York Harbor until his death at age 69 in 1855. Cullum, *Biographical Register,* p. 109. An 1805 graduate of USMA, Bomford had been engaged in fortification work around New York since 1810. Cullum, *Biographical Register*, Vol. I, pp. 58-59. William Cutbush to John Armstrong, March 15, 1813, Buell Document No. 400.

43. Black, *History of Fort Wadsworth,* p. 52. Guernsey, *New York,* Vol. I, p. 177.

44. Jonathan Williams to the Commission on Fortifications of the State of New York, January 18, 1810, Williams Papers. Black, *History of Fort Wadsworth*, p. 6. Swift *Memoirs*, p. 111.

45. War Department to George Bomford, July 28, 1813, Buell Document No. 442.

46. Swift, *Memoirs*, pp. 112-13, 123. William Cutbush to Joseph Gardner Swift, December 8, 1813, Buell Document No. 452. Cullum, *Biographical Register*, Vol. I, pp. 56-57. Guernsey, *New York*, p. 180.

47. Babcock, an 1808 graduate of the USMA, served in the New York area and in the field during the War of 1812. He was promoted to captain September 20, 1812. "List of all land purchased by U.S. for Military Purposes," *ASPMA*, Vol. II, p. 284. Call, *Reservations*, p. 220.

48. Cutbush to Armstrong, March 15, 1813, Buell Document No. 400.

49. William Cutbush to Joseph Gardner Swift, December 8, 1813, Buell Document No. 452.

50. Joseph G. Swift to John Armstrong, February 23, 1814, Buell Document Nos. 477, 478, and 479. Cullum *Biographical Register*, Vol. I, pp. 51-56. "List of all lands which have been purchased by the United States for military purposes.," *ASPMA*, Vol. II, p. 284. Call, *Reservations*, p. 214.

51. Joseph G. Swift to John Armstrong, February 23, 1814, Buell Document Nos. 478-79. John Armstrong to J.G. Swift, June 5, 1814, Buell Document No. 488.

52. Cutbush to Swift, December 8, 813, Buell Document No. 452. Samuel Babcock to William Eustis, October 1, 1812, Buell Document No. 359. Cullum, *Biographical Register*, Vol. I, p. 81.

53. Joseph G. Swift to William H. Crawford, August 31, 1816, Buell Document No. 671.

54. DeRussy was an 1812 graduate of the USMA and was assigned to New York Harbor as an assistant engineer. Following the war, he was assigned to fortification building on the Gulf coast before returning to New York. Cullum, *Biographical Register*, Vol. I, pp. 109-10. Department Orders, Headquarters Castle Clinton, May 13, 1817, Buell Document No. 722. Swift to DeRussy, May 15, 1817, Buell Document No. 721; Swift to George Graham, May 15, 1817, Buell Documents No. 722, 723, and 724.

55. J.G. Swift to John C. Calhoun October 12, 1818, *ASPMA*, Vol. I, pp. 811-12. Armistead to Vanderventer, November 30, 1819, Buell Document No. 834.

56. Report of the Board of Fortifications, February 7, 1821, *ASPMA*, Vol. II, pp. 305-15.

57. "Table exhibiting the permanent fortifications which have been erected or are now erecting. . . " February 25, 1824; A. Macomb to J.S. Calhoun, February 25, 1824, *ASPMA*, Vol. III, pp. 627-28.

58. Report of the Engineer Department, November 14, 1822, *ASPMA*, Vol. II, pp. 457-60.

59. J.C. Calhoun to James Monroe, November 29, 1823, *ASPMA*, Vol. II, p. 554. Adams, *Designating US Seacoast Fortifications*, p. 2.

60. J.C. Calhoun to the President, November 29, 1823, *ASPMA*, Vol. II, p. 554.

61. Runyon, "History" pp. 5-6.

62. Alexander Macomb to J.C. Calhoun, November 20, 1824, *ASPMA*, Vol. II, pp. 713-16.

63. "Report of the Operations of the Engineer Department during the Year Ending September 30, 1825," November 21, 1825. *ASPMA*, Vol. III, pp. 135-43. Call, *Reservations*, pp. 215-16. Runyon, "History," p. 7. Adams, *Designating US Seacoast Fortifications*, p. xxxi.

64. "Report of the Chief Engineer, November 18, 1826," *ASPMA*, Vol. III, pp. 358-59; November 20, 1827, *ASPMA*, Vol. III, p. 628.

65. "Report of the Chief Engineer, November 19, 1828," *ASPMA*, Vol. IV, p. 12. In July 1825, DeRussy, then on duty at Fort Morgan, AL, and in poor health, was assigned to the works under construction at New York. DeRussy traveled to New York for recuperation and then resumed fortification duties in the harbor.

66. "Report of the Chief Engineer, November 18, 1828," *ASPMA*, Vol. IV, p. 164. Colonel Gratiot had relieved Colonel Macomb in May 1828.

67. Statement of average prices paid for certain material and workmanship at Fort Adams, Rhode Island, and Fort Hamilton, New York, in the years 1828, 1829, and 1830..., March 30, 1832, *ASPMA*, Vol. V, p. 5.

68. "Report of the Chief Engineer, November 19, 1830," *ASPMA*, Vol. IV, p. 593. "Statement Showing Number of Persons Employed under the Engineer Department [at Fort Hamilton]," May 27, 1831, *ASPMA*, Vol. V, p. 98.

69. Annual Report of the Chief Engineer, November 13, 1832, *ASPMA*, Vol. V, pp. 42-43, 55. Annual Report of the Chief Engineer, November 23, 1833, *ASPMA*, Vol. V, pp. 184-85, 199. Prior to arrival at Fort Hamilton, Major Pierce's command had been posted at Fort Delaware, which was consumed by fire in February 1831. "Position and Distribution of the troops in the Eastern Department under the command of Brevet Major General Winfield Scott," November 1833, *ASPMA*, Vol. V, p. 177. Runyon, "History," p. 8.

70. Report from the Engineer Department, November 1, 1834, *ASPMA*, Vol. V, p. 386.

71. Runyon, "History," p. 8.

72. "Drawings exhibiting the progress made upon Fort Hamilton prior to the 1st of October, 1829," Drawer 40, Sheet 9, and "Plan, Fort Hamilton, 1869," Drawer 259, Sheet 71, Fortification Map Files, RG 77, NARA, Archives II, College Park, MD.

73. James St. Clair Morton, "Memoir on the Dangers and Defenses of New York City," September 30, 1858, Appended Document No. 12, Report of the Sec. of War, 1858, Exec Doc. No. 2, Senate and House Exec Docs, 35th Cong, 2nd Sess, pp. 494-581. Plan of Fort Hamilton Redoubt, September 18, 1864; Plan of Barbette Tier 1869, Fortification Map Files, RG 77, Archives II.

74. "Ordnance to Complete the Armament of Forts," February 27, 1836, *ASPMA*, Vol. VI, p. 121. R. Jones to Alexander Macomb, March 5, 1836, *ASPMA*, Vol. VI, p. 167.

75. Statement of Garrisons, November 30, 1836, *ASPMA*, Vol. VI, p. 823.

76. Report from the Engineer Department, November 29, 1839, Senate Exec Doc No. 1, 26th Cong, 1st Sess, pp. 162-63. Report of the Chief Engineer, November 19, 1841, Senate Exec Doc No. 1, 27th Cong, 2nd Sess, pp. 119-20.

77. Report of the Chief Engineer, November 1, 1842, Senate Exec Doc No. 1, 27th Cong, 3rd Sess, pp. 248-49.

78. Report of the Chief Engineer, November 2, 1843, Senate Exec Doc No. 1, 28th Cong, 1st Sess, pp. 98-99.

79. Report of the Chief Engineer, November 1, 1845, Senate Exec Doc No. 1, 98th Cong, 1st Sess, pp. 247-48; November 10, 1846, Senate Exec Doc No. 1, 29th Cong, 2nd Sess, pp. 119-20.

80. "Statement exhibiting the amount of money expended for fortifications in each of the states of the United States prior to September 30, 1840 and the annual appropriations and expenditures from that time to June 30, 1846," Senate Exec Doc No. 79, 29th Cong, 2nd Sess, pp. 1-12.

81. Report of the Chief Engineer, November 18, 1847, Senate Exec Doc No. 1, 30th Cong, 1st Sess, p. 606.

82. Report of the Chief Engineer, November 18, 1848, Senate Exec Doc No. 1, 30th Cong, 2nd Sess, pp. 256-57.

83. Runyon, "*History.*"

84. Report of the Chief Engineer, November 9, 1849, Senate Exec Doc No. 1, 31st Cong, 1st Sess, pp. 215-16; November 30, 1850, Senate Exec Doc No. 1, 31st Cong, 2nd Sess, pp. 353-54.

85. Report of the Colonel of Engineers, November 14, 1851, Senate Exec Doc No. 1, 32nd Cong, 1st Sess, pp. 349-50; November 30, 1852, Senate Exec Doc No. 1, 32nd Cong, 2nd Sess, p. 151. Report of the Chief Engineer, November 30, 1853, Senate Exec Doc No. 1, 33rd Cong, 1st Sess, p. 166; November 29, 1854, Senate Exec Doc No. 1, 33rd Cong, 2nd Sess, p. 102. Runyon, "*History*," pp. 8-9.

86. Report of the Colonel of Engineers, November 14, 1851, Senate Exec Doc No. 1, 32nd Cong, 1st Sess, pp. 349-50; November 30, 1852, Senate Exec Doc No. 1, 32nd Cong, 2nd Sess, p. 151. Report of the Chief Engineer, November 30, 1853, Senate Exec Doc No. 1, 33rd Cong, 1st Sess, p. 166; November 29, 1854, Senate Exec Doc No. 1, 33rd Cong, 2nd Sess, p. 102. Runyon, "*History*," pp. 8-9.

87. Report of the Chief of Engineers, November 8, 1859, Senate Exec Doc No. 2, 36th Cong, 1st Sess, pp. 642-43.

88. Runyon, "*History,*" pp. 6-7.

89. Report from the Engineer Department, November 29, 1839, Senate Exec Doc No. 1, 26th Cong, 1st Sess, p. 162. Colonel Totten succeeded Colonel Gratiot in 1838 and served as chief engineer until his death in 1863.

90. Lewis W. Call, *Military Reservations*, pp. 242-44.

91. Report on the Defence of the Atlantic Frontier from Passamaquoddy to the Sabine, April 24, 1840, Senate Exec Doc No. 451, 26th Cong, 1st Sess.

92. Douglas S. Freeman, *R.E. Lee: A Biography* (New York: Scribner's and Sons, 1934), Vol. I, pp. 186, 189.

93. Report of the Chief Engineer, November 19, 1841, Senate Exec Doc No. 1, 27th Cong, 2nd Sess, p. 120.

94. Freeman, *R.E. Lee,* Vol I, p. 189. Report of the Chief Engineer, November 1, 1842, House Exec Doc No. 2, 27th Cong, 3rd Sess, pp. 240-41. Lee spent the winter months, when work at the Narrows was on hold, as Totten's assistant at Washington, until he was ordered to take the field in the Mexican War in 1846. Report of the Chief Engineer, November 2, 1843, Senate Exec Doc No. 1, 28th Cong, 1st Sess, p. 100.

95. Report of the Chief Engineer, November 30, 1844, Senate Exec Doc No. 1, 28th Cong, 2nd Sess, p. 171; November 18, 1847, Senate Exec Doc No. 1, 30th Cong, 1st Sess, p. 607.

96. Report of the Chief Engineer, November 18, 1847, Senate Exec Doc No. 1, 30th Cong, 1st Sess, p. 607; November 18, 1848, Senate Exec Doc No. 1, 30th Cong, 2nd Sess, pp. 257-58. One of the leading intellects of the army, Delafield succeeded Totten as chief engineer in 1864. Cullum, *Biographical Register*, Vol. I, pp. 180-86.

97. Report of the Chief Engineer, November 9, 1849, Senate Exec Doc No. 1, 31st Cong, 1st Sess, p. 216; November 30, 1850, Senate Exec Doc No. 1, 31st Cong, 2nd Sess, p. 354.

98. Report of the Colonel of Engineers, November 14, 1851, Senate Exec Doc No. 1, 32nd Cong, 1st Sess, p. 350.

99. Report of the Colonel of Engineers, November 30, 1852, House Exec Doc No. 1, 32nd Cong, 2nd Sess, pp. 147, 151. Report of the Chief of Engineers, November 30, 1853, Senate Exec Doc No. 1, 33rd Cong, 1st Sess, p. 166; November 29, 1853, Senate Exec Doc No. 1, 33rd Cong, 2nd Sess, p. 101.

100. Captain Dutton was in charge of the Engineer Agency at New York, purchasing and shipping materials for public projects, when he was given temporary charge of the defenses at the Narrows. Barnard had extensive fortification and engineering experience in New York Harbor and elsewhere and had served in the field during the War with Mexico. Cullum, *Biographical Register*, Vol. I, pp. 275-76, 530-35. Report of the Colonel of Engineers, November 24, 1855, Senate Exec Doc No. 1, 34th Cong, 1st Sess, p. 195. Report of the Chief of Engineers, November 25, 1856, Senate Exec Doc No. 1, 34th Cong, 3rd Sess, p. 278.

101. Report of the Chief of Engineers, November 24, 1857, Senate Exec Doc No. 11, 35th Cong, 1st Sess, p. 174.

102. Report of the Chief of Engineers, November 22, 1858, Senate Exec Doc No. 11, 35th Cong, 2nd Sess, pp. 817-18; November 8, 1859, Senate Exec Doc No. 11, 36th Cong, 1st Sess, pp. 641-42.

103. Report of the Engineer Bureau, November 14, 1860, Senate Exec Doc No. 11, 36th Cong, 2nd Sess, pp. 259-60. Letter from the Secretary of War in Reference to Fortifications, December 11, 1854, House Exec Doc No. 5, 32nd Cong, 1st Sess, pp. 18-19. Senate Exec Doc No. 1, 36th Cong, 2nd Sess, p. 260. Report of the Engineer Bureau, November 30, 1861. War Department, *War of the Rebellion: A Compilation of the Official Record of the Union and Confederate Armies,* (GPO), Series III, Vol. I, p. 687.

104. Report of the Chief of Engineers, November 8, 1859, Senate Exec Doc No. 11, 33rd Cong, 2nd Sess, pp. 101-02; November 24, 1855, Senate Exec Doc No. 11, 34th Cong, 1st Sess, pp. 195-96; November 25, 1856, Senate Exec Doc No. 1, 34th Cong, 3rd Sess, p. 278.

105. Letter from the Secretary of War in Reference to Fortifications, December 11, 1854, House Exec Doc No. 5, 32nd Cong, 1st Sess, pp. 18-19.

106. Heitman, *Historical Register,* Vol. I, p. 992. Adams, *Designating US Seacoast Fortifications*, p. 21.

107. The new fort on the site of Fort Tompkins was officially termed "the fort on the site of Fort Tompkins" long after completion. In more recent times, the 3rd-System fort assumed the name of its predecessor work.

108. Message from the President of the United States . . . in relation to the military and naval defenses of the country, April 24, 1840, Senate Exec Doc No. 454, 26th Cong, 1st Sess, pp. 52-53. Letter from the Secretary of War in Reference to Fortifications, December 11, 1854, House Exec Doc No. 5, 32nd Cong, 1st Sess, pp. 18-19. Report of the Colonel of Engineers, November 24, 1855, Senate Exec Doc No. 1, 34th Cong, 1st Sess, p. 195. Report of the Chief of Engineers, November 25, 1856, Senate Exec Doc No. 1, 34th Cong, 3rd Sess, p. 278; November 24, 1857, Senate Exec Doc No. 11, 35th Cong, 1st Sess, p. 174. Call, *Reservations*, p. 242.

109. Report of the Chief of Engineers, November 22, 1858, Senate Exec Doc No. 11, 35th Cong, 2nd Sess, pp. 817-18; November 8, 1859, Senate Exec Doc No. 11, 36th Cong, 1st Sess, pp. 641-42.

110. Report of the Chief of Engineers, November 8, 1859, Senate Exec Doc No. 11, 36th Cong, 1st Sess, pp. 641-42. Report of the Engineer Bureau, November 14, 1860, Senate Exec Doc No. 1, 36th Cong, 2nd Sess, p. 260.

111. Report of the Engineer Bureau, November 14, 1860, Senate Exec Doc No. 1, 36th Cong, 2nd Sess, p. 260. War Department, *War of the Rebellion: A Compilation of the Official Record of the Union and Confederate Armies* (GPO), Series III, Vol. I, p. 732, Vol. IV, p. 504.

112. William P. Trowbridge graduated from USMA in 1848 and resigned after two years. He was in charge of the Engineer Agency in New York during the Civil War, which supplied material for fortifications, as well as to the field armies. He also served as superintended fortifications in New York Harbor until the end of the war. Colonel Prime was an 1850 USMA graduate and served on fortification duty until the Civil War. He served with the field armies until returning to fortification duty in the Northeast in mid-1863. He retired in 1871. Cullum, *Biographical Register*, Vol. II, pp. 343, 400-01. *Annual Report of the Secretary of War*, Annual Report of the Chief of Engineers, October 20, 1866 (GPO, 1866), pp. 423-24. Hereafter: ARCE, year.

113. ARCE, 1867, p. 9.

114. Gilmore conducted the successful bombardment of Fort Pulaski, GA, and the artillery siege of Fort Sumter. Cullum, *Biographical Register*, Vol. II, pp. 367-70.

115. ARCE, 1868, p. 13; 1869, pp. 12-13.

116. ARCE, 1871, pp. 14-15; 1872, pp. 11-12.

117. ARCE, 1873, pp. 11-12; 1874, pp. 13-14; 1875, pp. 13-14; 1876, pp. 14-15.

118. Adams, *Designating US Seacoast Fortifications*, p. 251.

119. Fredrick H. Dyer, *A Compendium of the War of the Rebellion* (Cedar Rapids, IA, Torch Press, 1908), Vol. III, pp. 1383-86, 1432-33, 1454-55, 1460, 1467, 1693-94. Hereafter: Dyer, *Compendium.*

120. James C. Bush, "The Fifth Regiment of Artillery," in Theodore F. Rodenbough and William L. Haskin (eds.), *The Army of the United States: Historical Sketches of Staff and Line with Portraits of Generals-in-Chief,* University Microfilms, Ann Arbor, MI, pp. 319, 377, 397, 443. Hereafter: Bush, "The Fifth Regiment of Artillery."

121. Dyer, *Compendium,* Vol. III, p. 1710. W.A. Simpson, "The Second Regiment of Artillery," in Theodore F. Rodenbough and William L. Haskin, (eds.) *The Army of the United States: Historical Sketches of Staff and Line with Portraits of Generals-in-Chief,* University Microfilms, Ann Arbor, MI, pp. 319, 443.

122. Bush, "The 5th Regiment of Artillery," p. 394.

123. Charles W. Abbot Jr., "The Twelfth Regiment of Infantry," in Rodenbough and Haskin, *Army of the United States,* pp. 555-56, 565.

124. Defenses of New York Harbor: East side of the Narrows of New York Harbor, Conditions of Seacoast Fortifications 1886-1887, Drawer 40, Sheet A, 1886, Fortification Map File, RG 77, Archives II. Hereafter: "Defenses of New York."

125. Lonnie R. Speer, *Portals to Hell, Military Prisons of the Civil War* (Mechanicsburg, PA: Stackpole, 1997), p. 3.

126. "Destruction of Fort Lafayette," *New York Times*, December 2, 1868, p. 1.

127. ARCE, 1878, pp. 12-13. "Defenses of New York Harbor."

128. ARCE, 1881, pp. 31-32.

129. ARCE, 1881, pp. 31-32; 1867, p. 10. "Fort Tompkins: A Look at the Great Work at Clifton, Staten Island," *Brooklyn Daily Eagle*, October 18, 1873, p. 6. Hereafter: *Brooklyn Daily Eagle.*

130. ARCE, 1872, pp. 12-13; 1875, pp. 15-16.

131. ARCE, 1885, p. 23.

132. ARCE, 1885, pp. 23-24; 1867, p. 10.

133. ARCE, 1871, p. 19; 1872, p. 12; 1873, p. 12; 1874, p. 15; 1875, p. 15. "Fort Tompkins," *Brooklyn Daily Eagle.*

134. ARCE, 1867, pp. 9-10; 1869, p. 13; 1870, p. 19; 1871, p. 15.

135. ARCE, 1870, p. 19; 1872, p. 12. *Report of the Board on Fortifications or other Defenses Appointed by the President of the United States under the Provision of the Act of Congress Approved March 3, 1885* (GPO, 1886), pp. 374-78.

136. ARCE, 1872, p. 12; 1873, p. 12; 1874, pp. 14-15; 1875, p. 15; 1876, pp. 15-16; 1878, pp. 14-15.

137. "Fort Tompkins," Brooklyn *Daily Eagle.*

138. ARCE, 1872, p. 12; 1873, p. 11; 1875, p. 14; 1877, p. 11; 1882, p. 28; 1885, p. 21. "Fort Tompkins," *Brooklyn Daily Eagle.*

139. ARCE, 1860, p. 259.

140. ARCE, 1867, p. 9; 1874, pp. 12-13. "Defenses of New York Harbor." Glen M. Williford, *The Transitional Coast Defense Generation, American Seacoast Defenses of the 1870s* (Self: Zionsville, IN, 2005). Hereafter: Williford, *Transitional Generation.*

141. ARCE, 1871, p. 14; 1872, p. 11; 1873, pp. 10-11; 1874, pp. 12-13. "Defenses of New York Harbor." Williford, *Transitional Generation.*

142. ARCE, 1872, p. 11; 1873, pp. 10-11; 1874, pp. 12-13; 1875, p. 13. "Defenses of New York Harbor." Williford, *Transitional Generation.*

143. ARCE, 1881, pp. 27-28.

144. Heitman, *Historical Register*, Vol. I, p. 874. William L. Haskin, "The First Regiment of Artillery," in Theodore F. Rodenbough and William L. Haskin, (eds.) *The Army of the United States: Historical Sketches of Staff and Line with Portraits of Generals-in-Chief*, University Microfilms, Ann Arbor, MI, 1966, pp. 308-11. Hereafter: Haskin, "The First Regiment of Artillery."

145. Haskin, "The First Regiment of Artillery," pp. 308-11.

146. The Fenians attempted to invade Canada to pressure the United Kingdom to give Ireland its independence. Haskin, "The First Regiment of Artillery," p. 310.

147. Bush, "The Fifth Regiment of Artillery," p. 398.